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Date: Tuesday, September 28, 2010

To: NHMFL User Committee

From: Scott Hannahs

Re: User Feed back for DC Field Facility Users

This is the annual feedback we have received from users of the NHMFL There are 80 entries from October 2010 through September 2011. A summary and analysis will be presented to the NHMFL User Committee during the Fall 2011 meeting.

As predicted in last years report the automated feedback system has dramatically increased the number of responses. This year there were close to 60 responses for the DC Field Facility more than twice that of last year. That has made this years report quite lengthy. For the sake of a manageable length report, the replies have been edited down to their essentials. If any member of the NHMFL User Committee wishes, the complete original reports are available.

The following table shows the frequency of requests and number of responses for the five of the seven user facilities that regularly collect statistics.

Facility	Frequency of Feedback Requests	#Requests	#Responses	Response Rate
Pulsed Fields	Weekly	168	7	4.17%
DC Fields	Weekly	834	56	6.71%
NMR	Quarterly	156	7	4.49%
EMR	Quarterly	55	8	14.55%
High B/T	Quarterly	17	2	11.76%

About 61% of the responses are completely positive with no problems or issues reported. A the remaining 39% of the responses were positive with either reports of minor problems with the facility or suggestions for improvements. When improvements are suggested the user is contacted by the facility director to clarify the need or to suggest an alternate instrumentation to accomplish the measurement.

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DC Fields ----------

First, thanks for your generosity in granting us this past time and additional energy when we needed it. Overall, our time was successful--we got data on bilayer graphene that, along with a few more experiments either in our lab or, preferably, on an 18T superconducting magnet system with 3He insert at NHFML, will form the basis for another nice paper. We also got some monolayer data on broken symmetry states; however, this data was not as complete as we would have liked partially for two major equipment reasons, which I outline below.

1) Probe wiring. The rotator probe on cell 12 had a poor connection into the SIP connector that is attached to the DIP header. This is something that just happened while we were measuring--we checked out the probe beforehand, found it to be ok, put in our device, which seemed fine, and started measuring for a few hours. Uncharacteristically, our device suddenly died mid-measurement. we loaded a few other devices, which all died on plugging into the probe. When we checked things out carefully, we found that one of the contacts was intermittently disconnecting; this was due to a bad solder connection at the SIP connector. Its probably not a problem that is possible to diagnose a priori, and its not by way of blame that I mention it, but just to let you know. We resoldered the wire and everything was fine with that probe from then on, but it was very annoying to lose our best sample in this way!

2) Magnet trips. We had a lot of them this week--at least one a day, and I think more--some were from low or zero field and didn't cause trouble. Two, at least, were from full field, boiled off a lot of He and also warmed up our sample. This was disastrous, as the thermal cycling (it warmed to 40K from 1.5K in less than a second!) changed the sample, necessitating restarting the temperature dependent series we were taking and wasting time and energy. The repeated thermal shocks eventually managed to actually pop our sample right out of its holder (it was affixed with silver paint, which can withstand cycling but only up to a certain point)! as you can imagine, this was a rather larger disaster. Also, the sample (mounted on a 1mm*1mm silicon chip) is now sitting somewhere at the bottom of the cell 12 VTI--its no use to us anymore, but I tell you for your information in case you warm up that insert anytime soon.

It seemed like a lot of trips in a single week, combined with the 18 tesla CLANK! sound that the magnet kept making, I hope everything is ok--I know its a brand new magnet.

Some more minor notes--

Scott Hannahs and Scott Maier know this, but for the record and as a reminder the Ruthenium oxide thermometer on one of the Cell 12 rotator probes is busted, and has to be replaced. We made do with Cernox, but users with a less tolerant measurment would benefit form the ruthenium oxide thermometer working.

There is an SRS830 lockin floating around that need repair and maybe calibration--you can identify it by the fact input terminal B has some clear epoxy keeping it in placed. The epoxy makes it hard to connect coaxes, and it looks like the inner pin is also damaged. I would suggest changing out the BNC bulkhead--we've done this and its not too hard. We tried to use this lockin, but it was very noisy, either for these reasons or for some others. We found another lockin, so no problem for us.

It would be convenient if there were some small pomona boxes available for users to make resistor boxes. Also, the available resistors in the instrument shop only go up to maybe 1 megaohm; it would be useful to have some that go higher, say 100 Mohm or 1GOhm.

Thats all for now--thanks again to everyone, particularly Eric, Scott Hannahs and Scott Maier.

DC Fields ----------

Everything worked very well. A minor glitch: Two pins on the rotator rig for probe C in cell 9 were shorted and that info was passed on to the folks at the end of the week.

Everyone was extremely helpful, Jon, Bobby, Tm and Jan. I mean extremely helpful.

DC Fields ----------

We are pleased to inform you that our results (experiment # P01220-E003-DC) were published today:

URL: http://link.aps.org/doi/10.1103/PhysRevLett.105.206401.

We would like to tank you and the NHMFL DC field group again for your support during the experiment.

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This support enabled us to collect this useful data in the short period of measurements. As elaborated in the article, new open questions emerge from the data. We hope to return for additional experiments in this matter soon (once achieving higher quality samples).

DC Fields ----------

When we used the magnet in cell 12, everything was going well.

We borrowed a thermometer from instrument shop which is cernox and the name is x44160. I think it is necessary to be calibrated because temperature was a little bit different from actual temperature.

I really appreciate good environment to carry out experiments.

DC Fields ----------

We have a great experience there. All stuffs that we need are prepared sufficiently, such as Lock-in, Dc,Ac current source, various cables,connectors. The software for data acquisitions performs very well and the magnetic field can be controlled easily and sweep to 18T steadily.

One problem to be mentioned. When the magnetic field sweeping through zero point from negative to positive, there are always some noises suddenly. Probably, it should be checked.

DC Fields ----------

I would thank for the help from Alice, Tim, Ju-Hyun and Glover.

Here's some suggestions:

1. The Keithley 2410 high voltage supply (1100V) is very useful. I noted that Magnet lab has only one of them, and I have to carry another one from our lab. I think getting more would be really helpful.

2. I noticed that the office in the mk building was removed. Currently there's only one office in the second floor of the main building has a bed. Making things worse is that office is far away from the system. A bed is very useful for measurement in SCM1 and SCM2. People could have a nap during the measurement and run the system for 24hr a day. If there's no way for an office in the mK building, could we have a couch or a mat not far from the system?

DC Fields ----------

The experiment was not successful. I am specifically talking about angular dependent magnetostriction in bismuth , which was carried on during the first evening of measurements.

I found Dave Graf very helpful and the challenge of mounting a miniature system on a two-axis rotation set-up quite challenging. He met this challenge in a very short time and Scott [Riggs] and Dave could rotate both mechanically and with the attocube piezoelectric rotator at low temperatures.

The problem was that the sensitivity was not good enough to detect quantum oscillations of magnetostriction let alone the additional features seen in transport (Nernst) measurements.

As far as I understand, measuring magnetostriction with a cantilever is a new technique recently developped in the magnet lab. It is still in its infancy and it was not clear, why the signal was drifting with increasing and decreasing magnetic field. The sensitivity was not good enough to detect the dip at 9T (the quantum limit of holes in bismuth for a field along the trigonal axis) in an unamiguous way. In retrospect, it would have been a better choice to stick to one-axis rotatio and use a tandard dilatometer with sufficient sensitivity.

Given the absence of any usefulresult, we decided that Scott uses the magnet time for an alternative high-field project on pnictide superconductors. I think he has been more successful on this project.

Dave is a reliable, pleasant, innovative researcher and working with him was a pleasure. I am sure that Scott shares this opinion.

DC Fields ----------

1) The machine shop was a great support. A central piece of our equipment broke enroute to the magnet lab, which required us to use a replacement that did not fit with our other apparatus. The machinists worked very effectively with my graduate student, Ilyong, to modify our other apparatus so as to fit the replacement.

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2) As you may recall, a problem developed with one of the transformers the week we were working. Your personnel helped coordinate our work with another group's work to maximize the amount of field time we could have. They were able to communicate very clearly what was and what was not possible.

DC Fields ----------

We have been working in Cell 12 at the NHFML from Jan 3rd to 7th. Dr. Jan Jaroszynski has been helping us all the week during the experiment. The experiment is quite smooth. Mr. Scott A. Maier has been helping us with the loading and unloading the sample every day, which has saved us quite some time. The only thing we may have a complain is that seven hours a day for the experiment may be a little too short, since it basicly eliminate the chance to replace the sample during the shift if the sample happened to be a bad sample or damaged during the experiment. Fortunately it didn't really happen to us this time.

DC Fields ----------

Joel, David, Alexey and Scott, Let me add my thanks. Well done !

Thank you for ensuring a smooth and successful magnet time this week. We had a successful run with nice data.

I would like to extend my gratitude to Joel for staying late when we needed him to.

Thank you to Alexey and David for supporting us so thoroughly, checking in at least every 2 hours either personally or by phone, and with S cott ensuring our probe was cold on time every time. I owe a particular thank you to David for running my laptop power supply to the airport today after having forgotten it in the lab. Beyond the call of duty!

DC Fields ----------

I am very pleased with the successful outcome of 4 1/2 days of measurements (Jan 10-14) and the reception that I got on my first visit to the NHMFL as a Senior Investigator having made the transition from NHMFL Postdoctoral Research Associate to Assistant Professor of Materials Science and Engineering at NCSU. I want to commend the tremendous support provided by the DC User Program under the direction of Eric Palm which made the visit a success. In particular, I want to thank the Director of DC Facilities & Instrumentation, Scott Hannahs for providing equipment including several Keithley digital multimeters and generously granting us the additional energy needed in order to complete the high magnetic field characterization of the Ic and quench behavior of the Bi2212 multilayer coils. I also want to thank Jun Lu for his generosity in lending his cryostat; Patrick Noyes for providing and assisting with the coil test instrument rack in Cell #4; Ulf Trociewitz for lending additional instrumentation; Tim DeGraff, Bryan Dalton, and Scott Maier for assisting with liquid helium and crane operation; and the Control Room Operators especially Larry Gordon.

Thanks to Alice Hobbs who was very accommodating in providing keys for access to the MagLab, instrument shop and visitor office(A112) in anticipation of our weekend arrival; Huub Weijers and Jan Jaroszynski who stopped by and offered useful suggestions.

I also want to thank Mark Bird in particular who stopped by on several occasions to see that the magnet (20T) was functioning normally.

I got a real sense that everyone associated with the DC User Program and MS&T wanted me to have a successful run and did everything possible to help make it so.

I look forward to submitting proposals and requests for magnet time under my own research program in magnetic materials in the near future.

DC Fields ----------

Our Magnet Lab run went fine. Despite some issues with the He3 cryostat in Cell 9, we managed to finish the experiments we set out to do.

The staff, Alex Suslov and Tim Murphy, were helpful as usual, and did their best to fix the problems.

DC Fields ----------

1.We would prefer to have additional breakout box (with Fischer connector and long cable) for preparing second insert while the other one is used in measurement.

The line corresponding to pin 9 on the available breakout box was discontinuous.

2. There was only one wirebonder available, and it was not a user facility.

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3. Probe station (preferably cryogenic one)would sample preparation easier for our experiment.
4. We received a great amount of help from Jan Jaroszynski, Scott Maier and Alexey Suslov.
5. Generally there was an adequate selection of electronic instruments. I suggest getting more Keithley 2400 sourcemeters.
6. It would be great to facilitate the transfer of data between data acquisition MAC and personal equipment (in my case it was Windows based laptop), such as by doing it through network rather than using flash drive. I was not able to connect through the network although I was told that in some cells it is possible.

DC Fields ----------

We want to mention an invaluable assistance and help with instrumentation by D. Smirnov. All mK staff, as always, was very helpful as well. We did find that one of the 7265 was acting funny and had to be changed. We recall that we encountered a similar issue with one of the 7265's during our previous visit in May. Also, during the first two days we have experienced unusually high noise level. It appeared that the noise level gets even higher when the B is swept. Using a noise crash cart and Tim's assitance revealed that the experiment was grounded correctly. On Wednesday we found out that the noise level depends strongly on the physical placement of the breakout box cable connecting to the probe. Hope this helps.

DC Fields ----------

The last week I spent in NHMFL is short but very impressive.

Especial thanks to Dr.Smirnov, Dmitry for his help during the whole week, Dr. Park, Ju-Hyun and Dr. Murphy, Timothy P. for their assistance of loading and unloading samples. Dr. Park, Ju-Hyun and Dr Jones, Glover E. for their help of LHe transer.

Hope to see you again in the near future.

DC Fields ----------

First of all, I would like to thank you and the magnet lab for funding the rexepedition of our probe back to Europe. It would have been impossible with our own DHL account, which does not allow an expedition from abroad.

This was the first time we were doing a Nernst measurement with an all-copper probe (made in Oxford and wired in Paris) and we succeeded in obtaining a signal-to-noise ratio comparable to what we had in the Grenoble high-field facility.

Everybody in magnet lab was quite helpful and in particular I would like to acknowledge Alexey Suslov and Tim Murphy who wonderfully assisted us.

We also had the opportunity to compare nanovoltmeters made by a Bristish company called EM electronics (see http://www.emelectronics.co.uk/) and the Keithley 2182.

In an attached file, you can see the comparison of the same signal measured by two nanovoltmeters set in parallel (Keithley's 2182 and EM's A20), the noise level is significantly lower in the case of the EM nanovoltmeter in spite of the fact that the filtering was much lower (Comparing the shift in magnetic field between the tow curves in this upward sweep, you note that delay is longer for Keithley).

I recommend to the magnet lab to buy nanovoltmeters made by this company. In their product list, A20 does not exist anymore, but N31 or A14 are good options.

DC Fields ----------

Hi, I just want to report that two pins of the breakout box in Cell 12 are grounded. I think they are B and K. Besides, another wire M(from breakout box to the probe) got disconnected sometime when we were checking the connection, but later it became good and remained good. We did not do anything during that time. Will NHMFL staff check those wires and repair them if necessary?

DC Fields ----------

Our beamtime was successful and we have got interesting results. The time provided was sufficient for completing all planned experiments. Eun Song was very helpful in mounting samples and running experiments. Great thanks to him for all help.

We also experienced several technical problems:

1. We observed in some T-sweeps a kind of noise, emphasized in lowering of the signal by several orders of magnitude. This happens at short T interval of 20-40 K afterward everything behaves normally. If this happens on cooling - heating of sample in the same conditions exhibits no such noise.

2. VTI and probe heaters turns OFF several times during heating T-sweeps. We had to paused data collection and turn heaters ON manually. This leads to necessity to repeat heating sweep data collection or rely on cooling data.

DC Fields ----------

I'll separate my comments into technical and non-technical ones.

We had an awesome run at the NHMFL last week. The optics setup worked great, and Steve McGill was very helpful as always. The on-going upgrades are also very exciting, and we are looking forward to those.

I do, however, have two non-technical issues.

1 - It's very difficult to communicate with Alice Hobbs. There have been several times when I have asked her a question (by e-mail) or on the phone and never received a reply. Even when she said that she would check into something. I don't appreciate having to follow up again and again. Not only is it a waste of time, but I don't like to chase people... especially when my questions are relatively straightforward. There are many days when Alice simply doesn't answer her phone. I am not sure why. The lack of communication sometimes morphs into upward delegation when I need to contact Scott Hannahs or Eric Palm instead.

2 - My group also stayed at the Village after the so-called upgrade. I really must say that whoever selected the furnishings for the Village condos does not have to stay there and has no sense of priorities. The mattresses, for instance, are merely the cheapest piece of foam that one can buy. I think we all know that the NHMFL needs to economize. BUT... We also know that having Users who are rested and "ready to go" enhances both science and safety at the Lab. And most people know that you get what you pay for in a mattress. (In that regard, it would have been wiser to forgo purchase of a headboard and put the extra money into a mattress, but I suppose it must have come with the "child sized" bedroom set.) I suggest that who ever is responsible for these cheap foam mattresses be required to live in one of the Village condos for a week or two. They would see how incredibly unrestful and inconvenient it really is. Simple air mattresses would be an improvement. I realize that I am not buying this place, and I also realize that this is not condo in Telluride. But my team does stay in these condos several weeks each year. And for $57/night, there ought to be a decent mattress in each unit.

DC Fields ----------

1) Was some piece of equipment in need of repair or calibration? Before the PL measurements were performed a fiber must be put into the probe.

2) Was someone particularly helpful (or not)? The help of Dr. D.Smirnov was particularly important.

3) Have you used an electronic instrument that does a job better than the one you used here? No.

DC Fields ----------

I would like to thank the hospitable host by Alice Hobbs for this trip to NHMFL. She is very nice and helpful.

And the experiment itself turns out to be very successful. By specific heat measurement, we revealed the interesting Bose-Einstein Condensation phase in a Heisenberg S=1/2 gapped quantum antiferromanget system-DIMPY. We also want to thank the technical support from Tim Murphy and Ju-Hyun Park. We are now analyzing the data and writing a paper about it.

For the suggestion to improve the performance of the instrument-SCM1, I have one thing to mention. We found that it is difficult to achieve reliable data from specific heat for the temperature below 150 mK at high fields. I wonder that if there is still room to improve it. Everything else looks great!

Thanks again for granting me the magnet time. I enjoyed my stay.

DC Fields ----------

During my magnet time in DC Field from 2/7/11 to 2/11/11, I have not encountered any problems neither with the personnel nor with the equipment. Everything was running normally during the experiment. I would like to thank Jonathan Billings and Timothy Murphy for their help with the set up in the first day of the magnet run. I also thank Joel N Piotrowski and Michael Hicks from the Control Room, especially for giving us 15min. extra (after 11:45PM schedule) to finish with the magnet sweep. I thank Dr. Eric Palm for granting an additional energy to finish the experiment. And, of

course, I am very grateful to Eun Sang Choi for being a host during my magnet time. Without his help with the equipment we wouldn't be able to obtain such excellent results as we did. I am already working on manuscript preparation which will include the novel experimental results that we have obtained on magnetothermopower in the organic conductor alpha-(ET)2KHg(SCN)4 and their comparison with the corresponding theoretical models.

It is a great pleasure for me to be at the Magnet Lab, to have the very first magnet run (without problems of any kind), to fell what experimenting means and to work with professionals.

DC Fields ----------

I found all equipment to be in good working order.

Scott Hannah and Tim Murphy were both particularly helpful in ensuring our run went smoothly. We had a need for an emergency repair on one of the rotator probe's right at the beginning of one of our runs, which they immediately addressed, even staying after their normal working hours to fix. We also had a few requests in a advance of our arrival, that were all met with no problems. In general I have found the support staff to be a pleasure to work with.

One piece of equipment that we use routinely is a kiethley 2400 source-meter. We have had to resort to leaving one at the magnet lab permanently, so as to avoid continually transporting back and forth. I found that others at the magnet lab have requested to use this in our absence which indicates there may be a more global need for this equipment. It may therefore be useful to consider purchasing one (or some) of these and making available for visiting users (as far as I know, none are currently stocked in the electronics equipment room).

DC Fields ----------

Thanks to your outstanding experimental environment and guidance, we could successfully finish our experiment.

Especially Dr. Alexey Suslov who was our experiment supporter was very helpful, kind and professional. We sincerely thanks to him.

The housing environment was comfortable and clean. But the only inconvenience was that the internet was not available in the condo.

DC Fields ----------

We overall had a very fruitful trip thanks to your support and kindness. The magnet and cryostat worked great for us, and the rotation probe was in the perfect condition without any shorts or disconnections.

Some SRS lock-in amplifiers showed noisy voltage read-out when the output voltage reading is below 0.2V. We could find and use some other SRS lock-ins which work well. If you could perform some calibration on them, it will be great.

Everybody was helpful and kind. We appreciate all your staffs for their help every time, especially Tim, Jonathan, Jan, Alexey and Alice.

We use KUSB-3116, which is a DAC/ADC made by Keithley and we find it very useful when we want to apply top- and bottom-gate voltages combined with your 20 V/V gain amplifier.

We perform gate sweeps with some special routine with it, so if NHMFL has one, it would be a great help for our experiment.

In addition, it would be very helpful if we have internet connection at the Magnet Lab Condo. We used to have the connection, but it has been gone for a few years already. It will help the users who are not equipped with those fancy smart phones to keep in discussion with their colleagues while they stay in the Condo.

Lastly, Kayoung Lee felt that the Cell 9 was too cold for her even with her warm jacket. We believe that the best solution will be to bring warmer clothing, but if there is some margin and flexibility to control the temperature in the Cell, the temperature may be kept higher for users from Texas.

Thank you again for all your support and we hope to enjoy using your great facility soon.

DC Fields ----------

I had a really successful visit to the NHMFL facility the week before last. The staff were incredibly helpful and it was a pleasure to work with them. I also found the Alumni housing to be conveniently located.

When at NHMFL, Dr. Jan Jaroszynski worked with me and guided me on every aspect of our measurements while there. Months before I came to Tallahassee for the experiment, he guided us via email on proper mounting of our samples on chip carriers and also on the proper chip carriers to purchase. When I first got there, he helped locate a

wire-bonding tool and helped in loading the samples. He helped with the electronic set up and even took time out to be a second pair of hands on the experiment since I came alone. While I wired samples, he was in Cell 12 loading our already loaded sample into the cryostat. He was there often as early as 10 am and stayed till past midnight every day while we ran the experiment. He also guided us with his expert advise on understanding our data, since we were doing measurements he has worked on for years. This was very helpful and appreciated. He guided me on proper protocol and experimental/safety procedures during all steps of the experiment. His hard work ensured that the experiment ran successfully with no equipmental faults or technical issues and hurdles for the entire week. I am extremely grateful to him for his support while I was there.

I am further grateful to the Popovic lab members for all the help they provided in mounting my samples. They showed me how to use the wirebonder and provided other material support. I am also grateful for the support of Scott Maier who provided a lot of technical support and a helping hand while we worked in Cell 12. Additionally, I thank the engineers who controlled the DC power to the magnets. Finally I am grateful to Alice for helping to facilitate arrangements for my stay there.

The only small hurdle I ran into was when I first arrived on Sunday. I was not successful in following the directions for opening the lockbox outside, which contained my key to the Alumni housing. At the time I could not work out the combination lock and was sort of left to my own wits without a place to stay, as the key to the alumni housing was in the lock box. It was after 10pm and I ended up finding the office for the Alumni housing, and calling an after-hours manager there who gave me a place to stay for the night, and to whom I am also grateful. The next day, on Monday, I was shown basically how easy the lockbox was (I didn't go past zero for the second turn... it was not in the instructions). My only suggestion would be that perhaps there can be an after-hours number for such situations. Or perhaps the instructions can be more precise. Either way, this was a minor incident.

Overall, I had a very productive and fruitful experience at the NHMFL facility. Thank you to everyone who helped make it so.

DC Fields ----------

Thank you for your email. I'm happy to provide feedback on our run.

Our experiment at the NHMFL was a qualified success. We did not get the result we wanted, as is often the case in science. This was because our superconducting bulks turned out not to perform as expected in high field, we found that simply removing the heat generated from flux moving through the superconducting bulks was challenging even in our Ag-loaded samples. Nonetheless the data we have acquired is of great use in allowing us to optimise the materials science of our growth process.

It is our intention to apply for another experimental run if there is a call for DC field time in Nov-Dec. By this time we will have prepared improved samples which will allow us to demonstrate a record high trapped field and investigate the high field performance of our engineering superconductors.

The assistance of Jan Jaroszynski as well as Tim Murphy and his team was invaluable - I really appreciated the extremely high level of high quality scientific and technical support provided. We were very much able to hit the ground running on our first day. Without this our time in Florida would have been much less successful.

DC Fields ----------

We had excellent support from the NHMFL staff. They provided equipment from their research group (not part of user facilites) that included the header with voltage taps and current leads, power supplies, quench protection, etc. Also, Patrick Noyes, a staff member in the MS&T group, worked on our project the entire week. Without his help, the testing would have taken much longer and I am not sure we could have completed these tests. In addition, we had many useful discussions with two other members of the Magnet Science and Technology research staff, Huub Wejers and Denis Markiewicz, who are leading the NHMFL effort to build a 32 T user facility magnet with YBCO insert coils. They expressed an interest in collaborating with us and helping with any future coil tests at NHMFL.

The liquid helium we ordered was provided on schedule. The 20 T magnet was available when we needed field, with two exceptions when it tripped out due to contamination in the cooling water. Otherwise, the magnet operation went smoothly. The coil quench protection system that we "borrowed" from MS&T was not as sensitive or as fast as the one being developed at BNL, and we are offering to share the design and operating information for this new system with NHMFL, as soon as it is available.

Supported by the U.S. National Science Foundation and the State of Florida

In summary, our experiment worked as planned, and we were able to get the data we needed. We look forward to returning in the future for more tests.

DC Fields ----------

I'd like to thank you for providing us with the opportunity to come to the NHMFL and perform the magnetic measurements, and for partially supporting our trip. We have obtained positive and promising results from our measurements, though we plan to come again to finish our measurements with refined samples. We had a great deal of support from many people of the Magnet Lab, and particularly from Alex Suslov and Lloyd Engel. The first helped us with the use of the magnet, the second with necessary equipment for our measurements. I'd like also to acknowledge support from the machine shop. We came with our own setup which needed some adjustment, and the machine shop quickly addressed our needs.

DC Fields ----------

It was a pleasure for me to visit the sunshine state and to do high-field ESR measurements using 25 T Keck magnet in Tallahassee. Employing high magnetic fields (above 16 T available at the Dresden High Magnetic Field Laboratory) appears of key importance for my project, in particular for studying temperature and frequency-field dependences of single-ion bound states in spin-1 large-D system (with H_c2 ~ 13 T). The most of information was obtained in fields between 16 and 21-25 T (in a swiping mode).

I am very pleased with my results. I particular thankful to Jurek Krzystek, who assisted me in the experiments. I am also thankful to Dmitry Smirnov for his help in the experiment preparation. Everything was beautifully organized, and already after 1 hour as we installed the sample and made a check, we got first spectra, first results. Good job!

This will be a good paper, I promise.

Thanks to Alice, who organized a condo for me and for my colleague, Christina Psaroudaki.

Thanks, guys!!!!

Looking forward to visit Tallahassee again.

DC Fields ----------

Our experience at the NHMFL last week was extremely positive all around. Ju-Hyun Park, in particular, was extremely helpful in all phases of our work. Tim Murphy and Scott Hannahs were equally helpful on the few occasions when we needed them.

It would be nearly impossible to spend such an intense week without any technical glitches. When we arrived, we found out that we had mounted our samples onto chip sockets with the wrong size pins, but that was the fault of somebody on our end -- your chip sockets are standard. We had one software malfunction early on that Scott fixed immediately. We had a second one on our final day (Saturday), when none of the staff were around, but we worked around it and lost only one run (about one hour's worth of data). During one night run, the rotating stage got stuck, which Tim fixed first thing in the morning. We really could not have asked for better service.

I have nothing negative to say at all, and I will recommend the lab highly to anybody who asks me about it.

DC Fields ----------

it's good.

DC Fields ----------

I was in Cell 6 for EMR measurements using the BWO-based system from April 5 through April 8.

Everything worked fine. The dewar (sample holding, inside the magnet) had an especially good lHe hold time. There were no problems with the "Keck" magnet operation. The magnet time available was not seriously affected by any electrical power limitations and we were able to look at all of the samples we had available.

My only very minor concern is that the printer linked to the data collection system in Cell 6 had some problems. This printer is very heavily used (abused) and might need replacement.

DC Fields ----------

Everything was fantastic, except we were a bit surprised when we went to get some equipment out of the instrument room (the one with the cables, wires, lock-ins, etc.) during the run and found that the doors are now locked. Fortunately, McGill was around and opened the room for us.

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We do however really appreciate the flexibility in the standby time and the power allotted to take care of the critical measurements once the experiment was working well.

DC Fields ----------

This is a short statement to stress that I find Dr. Jun-Hu Park very very helpful in carrying out my measurements. He is there all the time I needed any help . Further details are forthcoming from my stud3nt who worked with Dr. Park.

DC Fields ----------

We were satisfied during the magnet time. Everything was ready to use and in good condition. It is one of the best facility I have ever used. Dr. Ju-Hyun Park was extremely helpful. We appreciate all DC Field group members.

DC Fields ----------

We have had an productive measurement time at the NHMFL using SCM1 over the past week. We were particularly impressed with the efficiency of all the staff members (Tim Murphy, Ju-Hyun Park and Glover Jones) and their helpful guidance which made our measurement time very smooth and productive.

During the week we measured our CMOS-compatible devices suitable for quantum information processing. We were able to show in the measurements with the SCM1 system that our novel multi-terminal FinFET devices are capable of operating in the coulomb blockaded 0D regime (quantum dot regime), as well as observing the Zeeman shifts of paramagnetic states in the system with the large magnetic fields available.

With regard to the electronic instruments, a useful addition might be a semiconductor parameter analyzer. This can be helpful for users with the diagnosis and characterization of semiconductor devices (in our case the nano-scale CMOS-compatible qubit devices). We managed to make equivalent measurements using the individual Keithley source-meters available, however, a parameter analyzer will definitely make the measurements much more convenient.

Overall, we are very pleased with the amount of data we have obtained for a first visit to the facility. We look forward to future measurements at NHMFL.

DC Fields ----------

It looks like the area around the Village is going downhill rapidly. Perhaps a few more police patrols in the Village are in order.

Also, I don't like the new locked instrumentation room. (I am forever without a key!) Will we go back to the regular system soon?

DC Fields ----------

Yes, it would be very helpful if IR spectrometer (bruker IFS66v) could be checked/tested by a professional (bruker) engineer. Problems occurred when firing Hg arc source and positioning/changing beam-splitters in the spectrometer.

Yes, Dmitry Smirnov and Dmitry Semenov were very helpful, their help in testing equipment (spectrometer, probe, bolometer, etc.) and experiment setup is greatly appreciated.

Richard Tung was very helpful in solving problems that occurred during our run in the first few days. Being very familiar with the system and its performance he was able to resolve quickly equipment + noise problems and improve the quality of acquired data.

Yes, it would be very helpful if middle-infrared measurements could be extended to higher frequency ranges (at least up to 3000 cm-1). Currently, far-infrared bolometer signal falls off very quickly above 2000 cm-1. Addition of MIR detector would increase signal level and improve overall spectrum/data quality in that range.

DC Fields ----------

We would like to thank you for the support during our magnet time last week. We had a very successful experiment and collected a lot of valuable data. We would like to thank particularly to Scott Maier and Alexey Suslov for their helping the temperature control and the instruments setup.

A few suggestions I would like to make which hopefully can improve the future usage of the magnet lab:

1) When we were using the rotation probe of cell 12. We notice that the signal became very noisy during the rotation also during the field sweep at certain angles. It is most likely to do with the wiring to the rotation platform, since we had very good signal at certain angles and very noisy signal at the others. We had the same problem in our magnet time

last year August, and it became worst in this magnet time. It would be very helpful for the future user if this issue can be solved.

2) When we arrived on Sunday for preparation the instrument shop was locked and we had to borrow the key from other users. We should have asked for the key in advance. However it will be more convenient if the instrument shop key cab be provided as default together with the badge. Since the users almost definitely work on experiment after hours.

Thank you once again for the help and collaboration, we couldn't have such a successful week without you.

DC Fields ----------

We are extremely pleased with our most recent stay at the magnet lab. We had access to the highest possible field (45 T) for the time necessary to complete all our experiments. Access to adequate electronics was easy. I should mention that Ju-Hyun Park was the most professional host I have met at a user facility and that certainly played a big part in the success of our experiments.

We very much look forward to our next stay at the lab.

DC Fields ----------

I thank you very much for the support at the NHMFL. The measurements were indeed successful and I expect them to lead to publications and talks in which I will acknowledge the NHMFL.

With respect to your request for comments I would like to mention that the support by Tim Murphy was outstanding and very helpful. We had access to all the electronic instruments needed.

DC Fields ----------

Eun Sang Choi, the master of thermopower, was a critical and very hard working participant in this experiment! He was also very patient with the students, and they learned a lot from him in this set of experiments.

DC Fields ----------

I wish to thank you and your staff for a fruitful visit and use of your facilities. We are still analyzing our test data but expect that we will be submitting our results in a journal publication in the Journal of the Acoustical Society of America as well as the basis towards a MS degree thesis in Engineering Acoustics at the Naval Postgraduate School.

In particular I wish to acknowledge and thank Dr. Alexey Suslov and Dr. Tim Murphy. Both of these individuals provided in-depth introductions to your facility as well as innovative ways of looking at our investigation.

Again I wish to thank you and your staff for such as positive experience. We look forward to sending you a copy of our future publications from our visit.

DC Fields ----------

First, I should say that services provided by the support staff were excellent,

and I thank all of them.

Below, I report a few problems I noticed.

We avoided wires #5, 6, and 16 of the PDF rotation probe because we suspected deteriorated insulation. Signal from a cantilever connected to wires #2, 3, and 4 was noisy and the voltage often jumped. I inspected the cantilever afterwards but found no problem with it. Off course, this is not for sure, but if next users see similar problems with these wires, the wires should be inspected.

Was someone particularly helpful (or not)? Eun San, Andhika (Brooks' student), Tim and Ju-Hyun

All the instruments I used worked properly.

Lastly, I would like to request that the power consumption meter of the magnet control VI should be fixed so that users can see how much power they used. This is very important to plan measurements.

DC Fields ----------

Some of the Stanford Research Systems low noise preamplifiers in the DC user program have a large DC offset, on the order of 0.5 Volts. A small offset is common in these, and makes no difference to our measurement. A large offset hurts the resolution of our measurement because we must increase the maximum voltage range of our digitizers. This

necessarily results in a lower voltage resolution per bit. I suggest these preamps all be calibrated during shutdowns, once a year.

DC Fields ----------

We had a very productive visit. We were very pleased with the flex time arrangement. By relieving time pressure it allowed us to be more critical of the samples that we put in the magnet. As you know, we need to use our living samples within hours of making them.

We are thankful for the energy budget we had and that you were able to provide a small supplement at the last minute. It would be very helpful for the energy gauge in cell 7 to be adjusted to read the correct budget. We thought that we had tons of energy left on the last evening only to find out two hours into our time that we were likely to run out early.

Thanks again for your help and flexibility. It was a great trip for us.

DC Fields ----------

I am finally back to Vermont and I wanted to thank you on more time for a great magnet run.

I think we succeeded on everything we were set out to do and we are thrilled with the results. We can't wait to return when the cryostat will be ready.

In the meantime, we want to publish the low temp 10T data right away and I think we can also put the 27T data in there and advertise the magnet. We, of course feel you should be co-authors on this and we;ll send you a draft for review as soon as we have something.

I have started writing a letter of inquiry to Nature Materials and will send a draft to you for comment when ready.

One more time a big thank you for everything,

DC Fields ----------

One of the 2182A Keithly nanovoltmeter that we used was not accurate and the signal well above nanovolt levels when shorted. It was not used during the experiment as we had enough 2182A nanovoltmeters available.

All the operators in the control room are always very helpful. Scott and Eric were very responsive to our questions and helpful in dealing with power management. Bobbie Pullman was as usual extremely professional and helpful throughout the tests.

DC Fields ----------

We have lost 4 days of the magnet time due to the defective GPIB "isolator" which generated absolutely incredible amount of noise. It is very likely that it was also the main source of our problems during our January run (which we erroneously attributed to our samples)

As always, the support was great. Jan was very quick to respond to our request to take a look at the noise problem. Tim was very quick to figure out what was the problem. According to him, there was a similar issue in SCM1 not so long ago.

Yes, the older (blue) kind of the GPIB isolator has never gave us any troubles.

DC Fields ----------

Yes, Bruker IFS 66v needs serious attention! Current issue: spectrometer is not operable at low scanner velocities (v=0,1,2), interferogram center position is unstable. As a result only limited velocity options are currently available which affects quality of measured data and makes it difficult to solve noise issues. In some cases it was impossible to measure features of interest due to reduced sensitivity + high level of noise present in spectra when operating at high scanner velocities.

DC Fields ----------

We had a very good run, and the folks helping us (Tim Murphy, Bobby Pullum, Ju-Hyun Park, Jan) were great.

I have a couple of suggestion for instrumentation:

- it'd be great to have some Signal Recovery 5210 lock-in amplifiers, the only analog model on the market sold today.

- acquire one or two Keitley KUSB 3116 DAC. They have 8 output channels and 16 input channel, and they're great for multiple gate control and data acquisition.

DC Fields ----------

The infrared probe and jacket are bent, since the bolometer is almost the same size as the jacket, so it is very hard to put the probe in/out the jacket.

If we set velocity <=2 for the scanner, the signal becomes not stable.

Li-Chun Tung(Richard) is helpful in setting up the experiment and reducing the noise level.

DC Fields ----------

Sorry for my delay to reply. Briefly, I would like to report our experience in this term as a user.

Now we are reanalyzing the measured data in Cell 2 to confirm the change we observed by the rough on-site analysis. We will send the report regarding the scientific result separately after the reanalysis.

We used the new Cell2 in the second term of this August. Briefly speaking, our NMR measurement was very successful in this term, with your great help. In this mag-time, although we could get the essential data as we expected, we had to rush the measurements in the last due to instability of magnet supplies in the first 2 days. We would like to report this thing.

Since we were the first-time users (Yo and I) to use the mag-time in NHMFL, we were wholly inexperienced in the experimentation in the Cell2. Therefore, the installation of the equipments and cryostats for NMR was conducted mainly by the on-site NMR collaborators (Ricardo, Phil, and Arneil). The setup of equipments and cryostats was totally entrusted to them. It was very helpful to us. We could focus on the experimental program itself: for example, how to mount the sample to the field, which NMR frequency was the best, how the field markers work for NMR, etc. With their accomplished preparation for the experiment, it was ready to go at Monday morning of our mag-time.

Unfortunately, since the monday is the maintenance day for the magnet, we could start the measurement late in the afternoon. Besides, since the half of the magnet supply became out of service, the maximum field was limited to about 15 T. This problem of the half field continued to 2nd day (Tue)'s afternoon. To our experiment, the filed stability is very important since we want to detect the fine change of the NMR shift. Although I could not follow the detail, the magnet supplies (let say, A and B) had some problems at that time. The field-currents were very noisy until the 3rd day (Wed), here they switched to the another magnet supplies C and D. Although we could measure the NMR signals in the half fields and/or in the rather noisy fields, the data lost the accuracy due to the unstable fields (indeed, we could not use the data of Monday and Tuesday.) From Wed, however, the fields became very stable and our measurements were performed successfully. In the 4th day (Thu), we could reach finally to the maximum field ~30 T of Cell 2.

We heard that Cell 2 newly reinstalled the homogeneous field from Cell 7 just before our mag-time. From this reason, the appliances were not settled fully, and some of them were lacked (Electrical power supplies for equipments, vacuum ports, LAN, etc). Although we did not mind, the on-site users seemed to be confused a little bit. We hope that the settlements become improved for the users.

Regardless of these troubles, we are very satisfied with the data and user experiences. We can easily understand such kind of troubles in the large facility because we also live near the user facilities of neutron and muon sources. They sometimes encounter with machine troubles at the source side. In NHMFL, we have realized that the people at the source side are extremely expert and very kind to users, so the troubles were fixed quickly and we could take the nice data. Lastly, we hope that our result in this term will be admitted and that we could step up to hybrid time.

Thanks again for your great help.

DC Fields ----------

I have finished the experiments and going to fly back to Canada this noon.

All the instruments are returned and I also have my sample together with me with the help of Dmitry.

Thank you very much for all your great help during this week.

DC Fields ----------

I am very glad to have received this letter from you. Yes, I have smoothly completed this magnet time in the DC Field. It was a good experience in doing experiment in the NHMFL. From the early beginning, Dr.Han helped me to be familar with many aspects in the NHMFL,instr. Bobby helped me to prepare the heating furnace, the programming temperature controller, thermocouples,etc. Jonathan helped me to have figured out the sample holder's design and contacted with the workshop, there, Vaughan,Edward Anthony,John M.,and William helped to work the sample holder out just before

my experiment start. Jonathan also wrote the PTC10's programs and taught me how to use the PTC10. Scott helped to adjust PID value which made the temperature control more accurate. Thanks for everything to all of these people, well done. I also thank the control room, Joseph M. and Joel N,they always supply the field on time. I also thank Eric and Alice to arrange this magnet time for me.

I am very appreciated about everything done by all these people and the extra magnet hours Scott gave to me. Many thanks again.

BTW, I heard the computer will be upgraded every saturday morning. The upgrade may wipe out some programs. This may result in some issues if user wants to access programs without the magnet during the weekend. I hope such upgrading won't interfere with the existing program in the computer.

I also hope that the furnace can go to higher temperature such as 900C in the magnet with the field above 30T.

Pulsed Fields ----------

As a long-term user of large scientific facilities in Europe, I was very with the user programme at the Magnet Lab and am very happy with the progess we made with the experiment. John Singleton was especially helpful as the user support scientist and the success of the experiment is attributable to both his expertise and devotion of time to the measurements.

Pulsed Fields ----------

My recent magnet time went very smoothly. We managed to take some nice data and came away with ideas for how to prove the samples for subsequent runs. The new capacitor bank worked out just fine (I believe I was the first external user) and I especially appreciated the use of the apartment on 24th Street. Particularly helpful were: John Singleton, who worked long hours to help us get our data; Mike Gordon, Alan Paris, Darrell Roybal and Dwight Rickel, who handled the new capacitor bank; and Jonathon Kemper, who assisted greatly with matters regarding the apartment.

Pulsed Fields ----------

Was some piece of equipment in need of repair or calibration? No, everything worked perfectly. (2) Was someone particularly helpful (or not)? Yes, Dr Zapf was very helpful during my visit to NHMFL. She helped to run the PPMS. Also all her suggestions on data analysis were very fruitful. (3) Have you used an electronic instrument that does a job better than the one you used here? No. Thanks again for providing the facilities at NHMFL-LANL

Pulsed Fields ----------

Our experiments are completed. Acquired data is good enough for our purpose. Your staffs advised us, and helped us for my measurement & experimental procedure. After the pulsed field measurement, staffs (Dr. Jaime, Dr. Mun) taught me about several techniques of analyzing heavy fermion system. They recommended me to measure a heat capacity using PPMS dilution refrigerator. I have obtained important results using the heat capacity measurements. Now, we are preparing a preprint based on these results.

Pulsed Fields ----------

My experiment went well. I don't have any particular feedback. * The PPMS with dilution fridge was working perfectly fine while I was using. Vivien also helped me to get acquainted with this new system. * I appreciate your and Vivien's help in approving my travel grant for this experiment, without that most probably I wouldn't have come to laboratory. * I will definitely give acknowledgement in the publication related to this work. Thank you so much for being always so helpful.

Pulsed Fields ----------

The results obtained have suggested further experimental and theoretical work. In fact, single turn 130 T experiments have already provided new results. Moaz Altarawneh and Neil Harrison carried out the experiments on the single crystal sample that I provided. Interaction by e-mail permitted me to stay in touch with developments. The work should lead to a high quality publication. I greatly appreciate all the support provided at the Pulsed Field facility.

Pulsed Fields ----------

(1) We have completed our 65T pulsed field magnet time, and it was a scientifically most successful time. We found beautiful quantum oscillations in the pnictide superconductor LaRu2P2, which help us to understand its Fermi surface. (2) I would like to thank all the NHMFL staff for their most professional support for this experiment, as well as for their kind and friendly relations to me as a user, which made my stay also highly enjoyable on a personal level. (3) I have

collaborated with Fedor Balakirev for over a year now, on multiple magnet time stays, and I am very much looking forward to my next magnet time with him. He is an experienced scientist as well as a skilled experimentalist, and both was and is most helpful for our experiments. He always does everything possible to make the experiment successful, and invests a lot of energy and personal time into that. For example, we are also planning a new experiment to measure critical currents using current pulses in a pulsed magnetic field. This difficult experiment aimed at the evaluation of pnictide superconductors as potential materials for superconducting magnets would not be possible without the many hours Fedor spent building and programming the necessary ultra-fast electronics, which I greatly appreciate. (4) Also Ross McDonald supported this magnet time, even though he was originally not involved in this experiment. He helped us set up a cantilever we used for torque measurements. I appreciate his spontaneous effort to support this experiment, without which we would not have succeeded. (5) All equipment was working fine, except for the rotating probe stick, which would not rotate at low temperatures. We will thus have to repeat the angular dependence measurements on my next stay with a different rotator.

High B/T ----------

Xia was great as always. Everything worked very well. This issue with the experiment was with the sample, as it aged. A surface contribution eliminated our sensitivity to the internal properties. We are rethinking the experimental approach to avoid this problem.

High B/T ----------

One user of the High B/T facility pointed out that we could reduce the down time of bay 2 considerably if we could replace the old 3He circulation pumps with new pumps. He helped us make a successful request for supplementary funds to meet that need.

EMR Facility ----------

We have recently used the Mossbauer spectrometer housed in the EMR facility of NHMFL. The experiments went as planned, and we have been able to obtain all the necessary spectra in a reasonable time span. Dr. Ozarowski was very helpful in the process, and the data obtained will be used for two publications. One will be submitted to Inorganic Chemistry over the next 4-6 months, while the venue for the other manuscript is yet to be chosen. My only comment for improvement is to make it possible for students and postdocs to obtain training on the Mossbauer spectrometer and use it on their own. We've run a large number of samples, and I'm very happy that we obtained all the data, but it would be nice to see my student being able to run the instrument after this experimental sequence.

EMR Facility ----------

My experience in the EMR facility was great. Andrew Ozarowski took excellent care of the experiments and the samples. The data look great, and together with the results from the Keck magnet and some additional ENDOR data from our lab we will be able to submit a paper before the end of the year. Suggestions for improvements: Install a system that allows illumination of the sample in the spectrometer. This will allow us to observe light-induced states. They are very relevant in biological electron transfer (what my current maglab project is about) and to research on solar cell materials! Ideally, there is an optical fiber system that also permits short-wavelength sample illumination in the 200-300nm range. This would be a very important extension of the 17T system from my side.

EMR Facility ----------

The experiments ran finely. But ferritin samples turned out to be partially degraded. I have kept the samples in dry. But it did not protect the samples fully.

As usual, I have got a full support from the magnet lab scientists.

Due to a partial degradation of the ferrition samples, the obtained data are not fully reliable. Some more experiments are needed with a careful treatment of the samples.

At the moment, I have no particular suggestions.

EMR Facility ----------

The experiments ran perfectly.

As usually, I have got a full support from the magnet lab scientists.

I have got the nice data. I am writing a manuscript. The paper will be sent to a high profile journal.

The more coherent, high-power sources for a high-frequency pulse experiment should be developed.

Supported by the U.S. National Science Foundation and the State of Florida

EMR Facility ----------

There were some problems with signal instability at lower temperatures (~10 K). This should be looked into. Nevertheless, good data at 30 K on frozen solution samples, using the holders selected by Andrew Ozarowski worked very well. These holder have made frozen solution studied more feasible, which is very important to me.

EMR Facility ----------

The experiments for this project went all smooth, and everybody was very responsive and helpful. Improvement suggestions are similar to the ones discussed in the feedback I sent concerning the 25T system (attached again). Most important for the 15T transmission system:

(1) bring sample and field standard closer in space, (2) provide a hydrogen standard containing deuterium as well, (3) provide an in-situ sample illumination setup.

EMR Facility ----------

Feedback on my instrument time during 4/18/2011-4/21/2011: This was one visit in a series of visits to study the oxalate binding mode to the E280Q mutant in Oxalate Decarboxylase OxDC and to investigate the Mn(II) sites in the mutant W132F. + Unfortunately, the 13C ENDOR experiments were unsuccessful but we obtained information about relaxation times of the mutant. We also observed the pH dependence of the Mn(II) signal when oxalate was bound.

The cw EPR experiments showed that oxalate binds throughout the whole pH range which is interesting because it has implications on the gating of the enzymatic mechansim. + The W132F experiments were exploratory and went well. We now have a much higher concentration of the sample and are planning to come back to get better data on the higher spin manifolds which should allow us to distinguish different Mn binding sites in the mutant. + Answers to specific questions:

More or less. The instrument worked for the most part. We didn't have access to the 400 GHz range due to a broken frequency doubler but knew of the problem ahead of time.

Support staff in this case were Hans van Tol and Andrew Ozarowski. As usual they were very helpful and accommodating.

We will end up publishing data from this run, particularly the pH dependence of the cw experiments on oxalate bound to E280Q. The paper requires additional ENDOR data which we have to take at lower fields elsewhere. + The data on the W132F mutant which we got on this visit will likely be replaced by better data we hope to generate next week.

To distinguish different Mn(II) sites in biological samples it would be extremely helpful if one could routinely operate at temperatures below the lambda point of helium. The EMR group should look into ways to either modify or replace the present cryostat with one that allows for routine work at <2 K. Perhaps a better helium transfer line would already help to reduce cooling time for such experiments.

NMR Facility ----------

Dear Users committee: Experiments were successful and the trip was productive. There are no specific concerns at this time.

NMR Facility ----------

It has been almost two years since I joined the National high magnetic Field Laboratory, and needless to say, it has always been a pleasure. The resources that this facility offers for scientific research are nothing less than extraordinary. Currently, I am working with Dr. Grant and Dr. Schepkin here at the Mag Lab, Dr. Levenson at the Florida State College of Medicine and Hare at Institute of Molecular Biophysics. This partnership has allowed me to interconnect the power of MRI to biomedical research. It is an honor to be part of such a successful team and I look forward to continue conducting research here. I would also like to extend a special thank you to Jens Rosenberg, Parastou Foroutan, Ashley Blue, Jason Kitchen, Karol Bickett, as well as all of my major PIs for their support while working here.

NMR Facility ----------

As an in-house user, I have been involved in different solid-state NMR projects including collaborative projects with external users. I am satisfied with solid-state NMR spectrometers and supporting staffs. In particular, Jason Kichen is very helpful in terms of setting up the VT control system on the 900, maintaining the 900 VT probe as well as switching the VT probe's tuning frequencies (for different nuclei). In terms of improvements, it would be nice to have all sample packing tools available for different types of MAS rotors (7mm, 4mm, 3.2 mm, 2.5mm, etc.). Sometimes it was difficult

to find a needed packing tool. Also each instrument has three RF channel capability for triple resonance experiments and should keep enough RF cables for setting up triple resonance NMR experiments! Recently the 600 MHz NMR spectrometers are extremely busy so that it is difficult to get time (at least for me) for exploratory pulse sequence development. It would be very helpful if the management could think about upgrading the 300 MHz NMR 16-year old console so that it can be used for a staging system particularly for pulse sequence development.

NMR Facility ----------

This was my second trip to the MagLab and it was excellent. Victor Schepkin set up everything on the 900, and this allowed us to do the experiments we wanted. Kathy Harper brought everything we needed for the animal work. Fabian helped order supplies and modified the anesthetic setup for our requirements. The work we accomplished has been submitted for publication and we have acknowledged the MagLab support. We hope to visit again for further experiments to test pharmacological testing of our theory soon, as we cannot do these experiments elsewhere.

NMR Facility ----------

Comments: 1. No equipment needed repair, which I consider is VERY good. We were happy to use the newly developed equipment at the Magnet Lab for 21 T imaging. 2. Three people were VERY helpful during our visit: Victor Shchepkin, Peter Gor'kov and Bill Brey. Many other people provided their help as well. I can't mentioned a single person, who did not exceed our expectations. 3. We were able to use 21T imager and 21T 1H/23Na imaging probes. They are unique and surpass the sensitivity of any other istrument in the WORLD.

NMR Facility ----------

Chlorine MRI experiments help us to test our capability to perform imaging of low gamma nuclei. The quadrature RF coil for chlorine was successfully tested recently. There is large progress in image quality but the image quality is still below expectation. Q value of the RF coil was improved but it is still low. There are multiple interferences coming from the eddy currents created inside probe by imaging gradients. It would be great if more resources could be available for development of the MR imaging probes.

NMR Facility ----------

I found the facility excellent. We were able to acquire very high quality spectra using the 900 MHz magnet. Ivan Hung and Zhehong Gan were extremely helpful, both assisted us with experiment setup, and Ivan helped us in the wet lab, gave us a tour of the facility, and ensured we acquired high-quality spectra.
