

Report on candidates to a position of Professor of Physics with focus on magnetism.  
(Ref # PA2016/374)

Alphabetic list of top candidates

Hermann Durr, Bella Lake, Kim Lefman

From the list of candidate there are three candidates that stand out. The candidacy of Prof Bella Lake is easy to identify. Outstanding research and strong instrumentation interest. Impact of research of Prof Lake in the field of nanomagnetism and quantum matter is well established. Clear research focus on neutrons as a technique, ability to manage groups, numerous awards are all pointing to the strong potential for Bella Lake to take advantage of the LU position and proximity to ESS. Prof Lake has a very visible profile in neutron scattering community. At same time Prof Lake has demonstrated a strong interest in other techniques including muSR as a complementary probe of matter. Prof Lake has a proven track record of excellent teaching and supervision. The most recent PhD from the list.

Another candidacy that stands out is Hermann Durr. Strong and pioneering science mostly focused on fast dynamics of magnetism using light probes. As such the technique of expertise appear to be x rays and not neutron scattering. This aspect of core expertise would need to be balanced against the long term vision for ESS and LU. Connections to Max IV that Prof Durr can potentially bring should become an important synergy. At same time the advertised position calls for neutron scattering expertise. Prof Durr has a demonstrable record of scientific output. Strong record of student (co)supervision and supervision of students. Prof Durr, given his career in research institutions, has less of a teaching portfolio compared to others of teaching.

Another strong candidate is Kim Lefman. Prof Lefman has a fitting profile to interact and start the group going at LU. There are a lot of activities in the group of Prof Lefman that naturally connect to LU and ESS. Prof Lefman has a strong publication records. Some of the highly cited papers are done in collaboration with Prof Lake, where Lake is a first author. Solid record of the research activity focused on quantum magnetism. Prof Lefman demonstrated a strong record of supervision of students and PD.

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1. Bella Lake.

Focus of research program on the experimental investigation of magnetism in condensed matter and my particular interests are in strongly correlated electron systems with emphasis on quantum magnetism, topological phenomena, superconductivity, orbital and charge order and molecular magnetism.

Prof Lake is a young researcher (PhD 1997) with the wide range of relevant interests and with the strong overlap for the ESS and Max IV. She has a proven track record of producing outstanding results – magnetism and competing charge order in superconductors, magnetic excitations and nature of quantum critical fluctuations.

Significant funding profile and strong record of maintaining and developing research groups both at a junior and as a mid carrier professor level.

In the course of her carrier Prof Lake have been heavily involved in developments of new instruments and new facilities like the new detector for neutrons in the high magnetic field.

Prof Lake also demonstrated a sustained engagement in the academic research and teaching. Multiple membership panels and research applications point to a clear leadership role that can be expanded in the nurturing environment.

The work of Bella Lake on the magnetism induced in the cores of the vortices was the first indicator of the stripes and charge order being a close competitor to superconductivity in cuprates. This work is of fundamental importance and is very highly cited (about 700 citations total).

2. Bjorn Fak

Main interests of Prof Fak are in the frustrated and quantum magnetism, He3 and heavy fermion and Fermi liquid systems. Numerous instrument scientist appointments indicate a strong synergy with the build up phase of ESS and MAX IV.

Supervision is a steady part of the activity of Prof Fak. Majority of students as a secondary supervisor. Strong administrative skills as a group leader and as a deputy division leader. This also can explain a slower output at time when one is performing administrative duties.

Solid scientific interest and output through the years. The publication list of the candidate is extensive (~170) with 2900 citations.

Overall Prof Fak is strong candidate that fits the profile and will build the coherent strong research group.

### 3. David Navas Otero

Relatively young PhD with strong focus on nanomagnetism as a main research topic. Expertise in ultrafast spectroscopy and magnetism. Sustained scientific output with main focus on the neutron scattering studies of magnetism.

Dr Otero demonstrated ability to supervise and lead research projects. Supervision of one student so far which is consistent with the carrier stage.

Scientific output is solid: 47 papers with 1000 citations.

Good synergies in skills and plans with both EES and Max IV. Strong applicant within the somewhat younger cohort.

### 4. Edwyn Fohtung

Recent PhD(2010).

Main research focus is on the x ray imaging and more recently at neutron scattering center at Los Alamos. In the cover letter Prof Fotung did mention the ongoing research proposal with ESS. Strong connections with both Max and with EES are natural and would be highly beneficial for developing strong research program.

Proposal presents a coherent cutting edge research program on number of exciting topics. Imaging of buried interfaces and topological defects using magnetic and x ray imaging is a powerful set of tools to be used in the future.

Somewhat slower output scientifically with 12 papers and 54 citations.

Prof Fohtung started with the supervision of PD and students. Large number of undergraduate under supervision.

Candidate with excellent track record of raising funding. Demonstrated record of excellence in research with numerous awards both in US, EU and Russia. Excellent candidate.

### 5. Elizabeth Blackburn

Young reader at Birmingham, PhD 2006(?)

Prof Blackburn developed the design of the magnet that is used in experiments by users that likely took a significant investment of time.

Impressive and sustained track record of prizes and awards: award in teaching PGCert award, Moseley medal and prize from IOP (2014), Best Young Scientist of the Year 2006 from the Joint Research Centre of the European Commission, best thesis award ILL (2006). Candidate demonstrated a strong interest in advancing and integrating the teaching into a modern curriculum. This is an important component of a position that would couple to a leading neutron scattering and light source facilities. Candidate excels in this aspect.

Leadership and committee role. Prof Blackburn is a chair of the ESS committee on sample environment. She is active in the committee work of numerous user facilities in EU and US.

Supervision. Prof Blackburn has a strong record of supervision of students and postdocs.

Scientific output: the number of publications is 34 with 80 citations and consistent with the researchers at similar stages in their career. Number of highly cited papers.

Overall research profile and interests are fitting well with the scope of the position. Strong natural ties to ESS.

#### 6. Jan Dreiser.

Dr Dreiser is actively publishing with significant number of papers out: (46) with >2000 citations and with number of highly cited papers.

Main interests are in molecular and molecular clusters magnetism. Applicant is an expert with the solid publication record. Impact is consistent though the last 5 years.

Supervision. At this stage of carrier there is one PD who was supervised. Also there are numerous part time student appointments where Dr Dreiser is a supervisor or co-supervisor.

Strong established collaborations with the synthesis, chemistry and surface science groups at EPFL, KIT, Copenhagen.

#### 7. Kim Lefmann

Professor Lefmann has a strong interest in neutron scattering applications to multiferroics, magnetism and superconductivity. He is an established figure in the Nordic neutron scattering community.

Supervision: 6 PD, 14 PhD and 30 MSc students point to a strong and impactful research and teaching interest. One should note numerous awards for teaching

excellence.

Prof Lefman has an established track record of attracting the funding. Overall the applicant has a strong energetic research program and is a very active citizen of a neutrons scattering community.

Committee and leadership positions. Prof Leffman has served on numerous committees including ESS and is the member of the board for BIFROST at ESS.

Scientific output is good with 133 papers with 2711 citations. Strong applicant with a balanced portfolio.

There might be a good resonance between the vision of what the future activity might look like with the 5 areas and LU and ESS future plans. It clearly represents a strong and coherent vision for the position.

#### 8. Daniel Mannix

PhD in 1997.

Main interests of Dr Mannix are magnetism of correlated electron systems and neutron scattering instrumentation. Particularly important is the interest of Dr Mannix in developing a combined neutron/x ray spectroscopies that would be useful for functional materials. Field of research is well established and mostly focuses on the bulk samples with the growing interest in the interfaces and emergent states at interfaces. They are also relevant for the development of new tools at ESS and Max IV.

Research proposal that would fit Lund plans very well and natural given two years spent at LU. Natural connections that were formed would be useful to build upon and expand. I particularly appreciate the driven oxide research proposal and oxide samples laboratory proposed at LU.

Supervision: numerous students through the years. One PD.

Publications: 81 with 1250 citations, reasonable rate somewhat lower than other applicants as a similar stages of career.

Applicant demonstrated a sustained interest in teaching and designed the graduate course on advanced x ray microscopy.

#### 9. Mechthild Enderle

PhD 1993 with good balanced track record of publications and research.

Main research interests of Prof Enderle are in the area of quantum magnetism, multiferroic states and nature of collective magnetic excitations in magnetic states.

Publications and citations (100 papers with 1500 citations) is on track and consistent with the other applicant at similar career stage.

Prof Enderle spent time before and is now a guest professor at LU. These natural connections will allow one to build a strong research group aligned with the strategic interests of LU and ESS. Compared to other applicants with similar career path there seem to be less overlap with Max IV.

Over the last 20 years candidate demonstrated a strong record of supervision of PD and PhD students.

Committees and refereeing activities. Candidate had demonstrated a strong involvement in the academic and research committee work with participation in numerous review panels (German mostly).

I also would notice a natural connection to the chemistry dept for the sample growing capabilities that is a major plus.

Teaching. As part of Habilitation Prof Enderle had acquired a teaching certificate for all teaching levels. Significant teaching efforts are well documented in the application. Numerous PhD and MSc student. Not clear about supervision of PD.

Overall a strong application with the interests and synergies that make connection to ESS at LU natural.

#### 10. Martin Valldor

Prof Valldor has a unique background of being chemist and physicist and having worked in both areas.

PhD 2001 in preparation and characterization of high  $T_c$  compounds.

Career path for Prof Valldor seem to be evolving having 4 previous PD and now being a junior group leader.

Teaching and supervision. Applicant has designed and taught numerous courses on spins, chemistry and metals among others.

Publications and citations are consistent with others in the same age group.

#### 11. Amitesh Paul

Scientific interests of Prof Amitesh Paul are in GMR, magnetism at interfaces and nanoparticles, interfacial superconductivity and topological magnetic excitations.

Prof Paul is a mid career researcher, going through the habilitation process. PhD 2001.

Scientific focus on films and neutron scattering would make a natural connection to sample environment and to research at LU utilizing ESS.

Teaching: numerous courses and presentations at the graduate and masters level.

Supervision of numerous students.

Application of Prof Paul is consistent with the level and scope of other applicants at same stage of career.

## 12. Randy Fishman

PhD 1985.

Professor Fishman is a well known member of international neutron scattering community. This application has one of the largest number of publications by applicant with majority of them carried as a leader or as an important collaborator. Large number of paper with Prof Fishman as a first author indicating a significant and consistent strong output over the years.

Teaching. While at NDSU taught as a tenured faculty. Numerous students and PD supervised both at NDSU and at ORNL.

Prof Fishman has consistently demonstrated ability to interact and influence the experimental research directions, eg. As the case of neutron scattering prediction formolecular magnets, multiferroics and Dzyaloshinsky- Morya interactions in materials.

Strong and consistent research focus on modeling magnetism and neutron scattering properties of materials is a natural match to the long term interests of ESS and LU.

## 13. Roland Mathieu

PhD 2002

Scientific interests of Prof Mathieu are in the area of magnetism and charge order of manganites, GMR, CMR and multiferroics

Research focus on interplay of spin charge and lattice degrees of freedom and in resulting novel phenomena in correlated materials is a valid and established topic.

Prof Mathieu has supervised one PhD student and numerous PD.

Good overlap with the neutron scattering research at LU and ESS.

Application of Prof Mathieu is consistent with the level of activities and impact of applicants at similar stages of their careers. The two prestigious awards by Goran Gustafsson foundation are an important indicator of the sustained research output in the future.

14. Petronella Pascale Maria Deen.

PhD 2003.

Prof Deen research interests are in the field of quantum magnetism.

Candidate has a very strong connections to ESS as one of the senior scientists.

Previous experience in other user facilities.

Teaching experience in schools and lectures.

Supervision of master student and PhD level student.

15. Hermann Durr.

Impressive application with the strong overlap of interests with the research themes at ESS and at Max IV.

Application shows strong and outstanding record of publications. Research focus and interests in the new probes of matter in time domain is very exciting.

Teaching and supervising. Prof Durr shows a sustained efforts in supervising student and PD.

PhD 1989.