物性機能設計研究室　1

1）当該研究室の研究成果について

( ) Excellent (*) Very Good ( ) Good ( ) Fair ( ) Poor

研究テーマとして

1．第一原理計算と機械学習に基づく新しいスピン機能材料の理論設計

2．スピントロニクス・デバイスにおける電気伝導特性の理論解析

3．材料・デバイス機能を設計するシミュレーション手法の開発

4．水素，水素化合物の金属化と超伝導

5．第一原理構造探索手法の開発

が挙げられている。当該研究室は理論研究グループとして研究テーマ2，3に関連して、実験グループとの共同研究に基づく成果が顕著である。これは学理を究める上で重要な貢献を担っているともに、産業応用へ向けた確固たる足場固めに貢献していると言える。研究テーマ1に関連する新しい研究の取り組みについて学会発表も行なわれており、評価できる。今後、関連する多くの研究成果が成就されることを期待する。研究テーマ4,5に関連する研究成果も定常的に進展がある点については、評価できる。

2）当該研究室構成員の学会活動について

( ) Excellent (*) Very Good ( ) Good ( ) Fair ( ) Poor

定常的に研究分野に関連した国際会議の企画・運営を担っており評価できる。また構成員の学会発表も定常的に多数行なわれており、勢力的な研究活動がうかがえる。

3）当該研究室構成員の社会貢献について

( ) Excellent (*) Very Good ( ) Good ( ) Fair ( ) Poor

教育活動として、定常的な大学・大学院生レベルの講師だけでなく、高校生レベルへの貢献も行なっており評価できる。産業界への指導や、日本学術振興会での専門員を務めており評価できる。

4）当該研究室の競争的資金の獲得状況について

(*) Excellent ( ) Very Good ( ) Good ( ) Fair ( ) Poor

科学研究費補助金および受託研究費、ともに定常的に獲得しており、高く評価できる。理論研究グループとしての獲得額は一定水準以上をはるかに上回っている。

5）国際共同研究・連携研究・連携教育活動の実績について

( ) Excellent ( ) Very Good (*) Good ( ) Fair ( ) Poor

国際共同研究・連携研究は時間を要する場合があると考えられるが、今後の進展に期待される。

6）共同利用・共同研究拠点活動の実績について

( ) Excellent (*) Very Good ( ) Good ( ) Fair ( ) Poor

定常的に拠点活動を支援または牽引しており評価できる。

7）その他、総合的なコメント

東北大学附置研究所（共同利用・共同研究拠点）としての電気通信研究所内で活動する理論研究室として、その貢献度合いは優れていると見受けられる。また学外へ移動した理論研究者が国立研究開発法人等で活躍している点についても高く評価できる。

一方、これまで実験グループとの共同研究を通して示唆された、理論分野における新規課題や研究の方向性をいち早く全国の関連する理論研究室や関連分野を担う研究者に展開する側面も重要である。そのような成果が表に出てくることを期待している。

物性機能設計研究室　2

1. How would you evaluate the research activities in this period?

(*) Excellent ( ) Very Good ( ) Good ( ) Fair ( ) Poor

The activity of the Materials Functionality Design Laboratory is excellent. Their dissemination level is very high with constant number of publications in leading scientific journals with very high citations. They also maintain their activity level of presentations domestically and internationally, including several invited talks. The Laboratory has an excellent reputation worldwide as they have been proposing new materials and properties, such as Heusler alloys, magnetic tunnel junctions and hydrides. They continue to collaborate with many experimental groups inside and outside of Japan to feedback their proposals.

2. How would you evaluate the activities of the members in the laboratory for the academic societies?

(*) Excellent ( ) Very Good ( ) Good ( ) Fair ( ) Poor

The Materials Functionality Design Laboratory has been very actively involved in academic societies, not only by giving presentations but also by lecturing at schools for early career researchers. The Laboratory has also been leading the Spintronics Academic Alliance domestically and the JSPS Core-to-Core Research Project on New Concept Spintronics Devices with the UK and German groups. They have been organising a series of workshops and symposia with attracting world-leading researchers over the last decade. Their contribution to the Japanese spintronics community is enormous..

3. How would you evaluate the contribution of the laboratory to society?

(*) Excellent ( ) Very Good ( ) Good ( ) Fair ( ) Poor

Three patents were filed by the Materials Functionality Design Laboratory jointly with experimental groups. The Principal investigator of the Laboratory lectured at many schools and workshops. Besides, he gave an introductory lecture at Sumitomo Metal Mining and acted as a member and secretary of JSPS screening and evaluation committees for fellowships and international exchanges. These substantial contribution to the society in addition to their activities during the open campus is significant.

4. How would you evaluate the lab's level of funding?

(*) Excellent ( ) Very Good ( ) Good ( ) Fair ( ) Poor

The Materials Functionality Design Laboratory has secured almost JPY 184M over the last five years from JSPS and JST, including two Grant-in-Aid for Scientific Research Type S and CREST projects. These track records are excellent, confirming the importance and productivity of their research activities. The reviewer anticipates they continue to maintain their research level.

5. How would you evaluate the lab's collaborative research, including international joint research and collaborative education?

(*) Excellent ( ) Very Good ( ) Good ( ) Fair ( ) Poor

Through the JSPS Core-to-Core project, the Materials Functionality Design Laboratory has been very actively collaborate with groups in the UK and Germany. Additional collaboration with the UK

has been established via the RIEC project. Eight lecture modules have been taught by the Principal Investigator of the Laboratory. In the last five years, 12 BEng and 12 MEng students have been graduated from the Laboratory. These achievements confirm that the Laboratory has been fostering your researchers constantly, which is crucial as an academic institution.

6. RIEC is one of Japan's "Joint usage/Research Center" or "Nation-wide Cooperative Research Projects" institutes. How would you evaluate the achievements of work done under this framework?
(*) Excellent ( ) Very Good ( ) Good ( ) Fair ( ) Poor

Via the RIEC projects and the other programmes, domestic collaborations with Ritsumeikan, Tokyo, Osaka and Tohoku Universities have also been developed by the Laboratory for materials design and development. These broad collaborations meet the scope of RIEC.

7. Additional or overall comments

The performance of the Materials Functionality Design Laboratory is clearly world-leading. Their contributions to the experimental groups by proposing new materials and characterising interfaces in devices. The reviewer strongly support their activities and trust their further success in research.

物性機能設計研究室　3

1. How would you evaluate the research activities in this period?

( ) Excellent (*) Very Good ( ) Good ( ) Fair ( ) Poor

The group is small, with two permanent researchers, each one leading his own research line: Materials Functionality Design and Materials Science under Extreme Conditions. The production of the group, both in publications and participation in conferences, is important. The journals where they are publishing have a reasonable high impact factor, although I am missing publication in very high impact journals.

2. How would you evaluate the activities of the members in the laboratory for the academic societies?

( ) Excellent ( ) Very Good (*) Good ( ) Fair ( ) Poor

Even though they have not become part of any committee of any academic society, the group has planned and organized several academic international conferences. Besides that, they do not show to be the editor or reviewer for academic journals.

3. How would you evaluate the contribution of the laboratory to society?

( ) Excellent ( ) Very Good (*) Good ( ) Fair ( ) Poor

Even though they did not participate in any outreach activity, they took part in several educational activities outside university and in other instruction activities for industrial partners and public organizations.

4. How would you evaluate the lab's level of funding?

( ) Excellent (*) Very Good ( ) Good ( ) Fair ( ) Poor

Considering the group is small I think they were able to get a very reasonable funding.

5. How would you evaluate the lab's collaborative research, including international joint research and collaborative education?

( ) Excellent ( ) Very Good (*) Good ( ) Fair ( ) Poor

The Materials Functionality Design line shows a strong collaborative network in Japan, much stronger that their international collaboration, which I think they should strength.

6. RIEC is one of Japan's "Joint usage/Research Center" or "Nation-wide Cooperative Research Projects" institutes. How would you evaluate the achievements of work done under this framework?

( ) Excellent (*) Very Good ( ) Good ( ) Fair ( ) Poor

The group shows a high achievement.

7. Additional or overall comments

The general research outcome of the group is important, however, I think there is a too weak collaboration between both research lines in the group.