KENS instruments at J-PARC MLF
Shinichi Itoh, Institute of Materials Structure Science (IMSS), KEK.

The KENS was established in 1978 as a division of the Booster Utilization Facility in KEK. The pioneering works on the pulsed neutron source, instruments and scientific activities have been expanded at the Materials and Life Science Facility (MLF) in J-PARC. The present KENS has a role to promote an inter-university research program as a neutron science part in the Institute of Materials Structure Science (IMSS), KEK.

### “Extreme” neutron experiments and science

- **Highest resolution**
  - BL8 BL12: Δd/d ~0.035%

- **Polarized Neutron Technique**
  - The key to explore “Hydrogen and Spin in Matter” emphasize uniqueness of neutron & complementarity with other quantum beams

- **sample environments**
  - In-situ measurement: Temp, Pressure, etc.
  - BL09 observation of battery components as working

- **Intensity**
  - BL16 BL21 sample: ~1mg

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KEK Inter-University Research Program (S-type project) and Beam Lines at MLF

<table>
<thead>
<tr>
<th>ID</th>
<th>PI</th>
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<tr>
<td>2021S01</td>
<td>S. Itoh (KEK)</td>
<td>Studies on Dynamics in Condensed Matter by using the High Resolution Chopper Spectrometer</td>
<td>BL12 HRC</td>
<td>U. Tokyo</td>
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<tr>
<td>2019S03</td>
<td>K. Mishima (KEK)</td>
<td>Fundamental Physics with Pulsed Cold Neutrons</td>
<td>BL05 NOP</td>
<td>Tohoku Univ.</td>
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<td>2019S05</td>
<td>M. Hagihara (JAER)</td>
<td>Structural Study of Functional Materials using SuperHRPD</td>
<td>BL08 SuperHRPD</td>
<td>Tohoku Univ.</td>
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<td>2019S06</td>
<td>K. Ikeda (KEK)</td>
<td>Analysis of ordered/disordered structure in functional materials with high intensity neutron total scattering technique</td>
<td>BL21 NOVA</td>
<td>Tohoku Univ.</td>
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<tr>
<td>2019S07</td>
<td>H. Endo (KEK)</td>
<td>Study on slow dynamics by the neutron resonance spin echo spectrometers (VIN ROSE)</td>
<td>BL06 VIN ROSE</td>
<td>Tohoku Univ.</td>
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<tr>
<td>2019S09</td>
<td>T. Yokoo (KEK)</td>
<td>Study on Cross-correlated Physics by Polarized Neutron Spectrometer, POLANO</td>
<td>BL23 POLANO</td>
<td>Tohoku Univ.</td>
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<td>2019S10</td>
<td>T. Saito (KEK)</td>
<td>Structural Study of Functional Materials and its Reaction Mechanism</td>
<td>BL09 SPICA</td>
<td>Tohoku Univ.</td>
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<td>2020S16</td>
<td>H. Seto (KEK)</td>
<td></td>
<td>BL16 SOFIA</td>
<td>Tohoku Univ.</td>
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- **In-situ observation**
  - BL12 Neutron Spin Echo
  - BL16 SOFIA Spin

- **Neutron Time Measurement**
  - For full utilization of the neutron intensity, noise from sample environment are reduced by a radial collimator

- **Neutron Life Time Measurement**
  - POLANO just started its instrumental calibrating with “unpolarized” neutron beam in Nov 2017. Expected neutrons were successfully transported and detected.

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- **Beam optics**
  - SuperHRPD

- **Automatic structure refinements**
  - MLF (JAEA) R&D

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- **In-situ polarized Neutron Spin Filter**
  - Magnetically shielded solenoid

- **In-situ neutron spin filter**
  - Laser optics

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- **JST/Kyushu U.**
  - Kyoto U./NEDO
  - JST/Riken U.