

# 第260回

## 物質科学セミナー

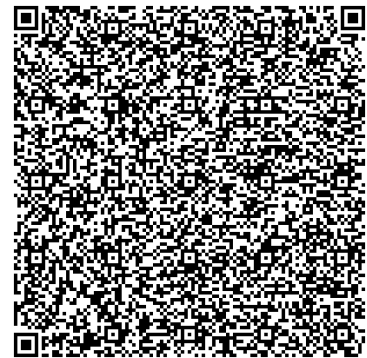
題名 : Current status of the ESS Cryogenic Moderator system (CMS) and an in-situ ortho/para hydrogen fraction measurement system

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日時 : 2021 年 9 月 15 日 (水) 16:30 –

場所 : 総合科学部 K207 および Teams  
によるハイブリッド方式  
(講演は日本語で行われます。)



### 講演要旨 :

The European Spallation Source ERIC (ESS) is going to provide long-pulsed cold and thermal neutron fluxes at very high brightness. They are produced by a linear proton accelerator with an average beam power of 2 MW (5 MW in the future), which is directed onto a tungsten target at a pulsed repetition rate of 14 Hz. Two cryogenic hydrogen moderators (four in the future) have been designed to cool high-energy neutrons down to cold neutrons by subcooled liquid hydrogen. The cold moderators perform optimally if the para-hydrogen fraction is higher than 99.5%. The Cryogenic Moderator System (CMS) has been designed to circulate the liquid hydrogen by two pumps to maintain the allowable average temperature rise over each moderator below 3 K caused by the nuclear heating at the moderators. An in situ real-time measurement system for ortho and para fractions of liquid hydrogen (OPMS) is being developed in collaboration with J-PARC, JAXA, Hiroshima University, MAX-IV (Sweden) and FZJ (Germany) in order to ensure a high fraction of parahydrogen at the moderators and detect undesirable neutron scattering driven para-to-ortho back conversion. The measurement precision of 0.1% ortho-hydrogen fraction is required. The CMS installation will be completed by the end of this year and commissioning will start in 2022 to accomplish beam-on-target in December, 2023.

5 研究科共同セミナーの認定科目です。

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