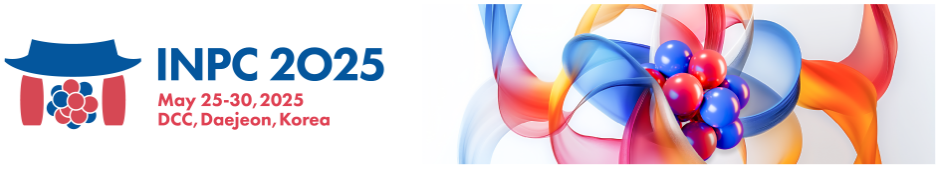

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Status of Z=119 element search at RIKEN

Tuesday, 27 May 2025 14:30 (30 minutes)

Following the discovery of nihonium (Nh: Z=113), the RIKEN Nishina Center for Accelerator-Based Science (RNC) has started a new program aimed at producing additional new elements in the eighth period, the 119th and 120th, by hot fusion reactions. To achieve this goal, the RNC has upgraded a superconducting linac accelerator (SRILAC) and a superconducting ECR ion source to increase the beam intensity and the maximum acceleration energy. We have also constructed a new gas-filled recoil ion separator (GARIS-III) designed for the hot fusion reaction measurement [1]. Commissioning of these key devices was completed in 2019 and the ^{51}V beam can now be accelerated up to 6.5 MeV/u.
Subsequently, a new collaboration, the 'nSHE collaboration,' was established, bringing together researchers from Japan, the USA, France, Poland, Australia, and China.
The experiment to synthesize element 119 is currently underway using a ^{51}V+^{248}Cm $\rightarrow$ Z=119 reaction with a high-intensity beam. A highly enriched $^{248}Cm_2O_3$ material was provided to RNC under the Material Transfer Agreement between RNC and Oak Ridge National Laboratory.
In this presentation, we will report the current status of the experiment, highlighting the experimental setup, the methodology for determining the optimal reaction energy, and the progress toward detecting element 119.

[1] H. Sakai, H. Haba, K. Morimoto and N. Sakamoto, Eur. Phys. J. A. 58, 238 (2022).

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