

E435

## PROPOSAL FOR EXPERIMENT AT RCNP

16 July 2014

**TITLE:**

**Structure of excited states above the long-lived ( $T_{1/2} \sim 2.0 \times 10^5$  y),  $K^\pi = 8^+$  isomer in  $^{186}\text{Re}$**

**SPOKESPERSON:**

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**EXPERIMENTAL GROUP:**

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**RUNNING TIME:** Data runs 6 days

**BEAM LINE:** EN

**BEAM REQUIREMENTS:**

Type of particle: d

Reaction to be used:  $^{186}\text{W}(d,2n)$

Beam energy: 11-20 MeV

Beam intensity: up to 5 pA

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**SPOKESPERSONS:** F.G. Kondev and M.P. Carpenter

**SUMMARY OF THE PROPOSAL**

We propose to utilize the unique opportunities that exist at RCNP, such as the availability of the CAGRA  $\gamma$ -ray clover array and deuteron beams, in order to study nuclear structure properties of  $^{186}\text{Re}$  above the very long-lived ( $T_{1/2} \sim 2.0 \times 10^5$  y),  $K^\pi = 8^+$  isomer. The new results would be valuable in reducing the nuclear physics uncertainties for the  $^{187}\text{Re}/^{187}\text{Os}$  cosmo-chronometer and for the better understanding of configuration-dependent shapes and the competing dynamics in transitional nuclei. We propose to employ the  $^{186}\text{W}(d,2n)$  reaction at three different beam energies in conjunction with the  $\gamma - \gamma$  coincidence technique and the CAGRA spectrometer. Since direct coincidences across the isomer are impossible, the assignment of new structures to  $^{186}\text{Re}$  will be based on the observed  $\gamma$ -ray coincidences with the Re X rays, the relative population of the excited structures at the different beam energies, and the knowledge of the structure of neighboring nuclei.