



ID de Contribution: 50

Type: **Poster**

First Spectroscopy of the R-process Nucleus ^{110}Zr

mercredi 11 mai 2016 14:30 (20 minutes)

The structural evolution on the far neutron-rich side of stability is critical for defining the features of the elemental abundance distribution created during the rapid-neutron capture process (r-process). A potentially large shell-gap was historically predicted at $N=70$ in ^{110}Zr , which could significantly modify the r-process abundances before the $A=130$ peak. Recent lifetime measurements in the region suggest however that ^{110}Zr is well deformed. We present the first direct data on the structure of this nucleus, spectroscopy of the low-lying $2+$ and $4+$ states, and will discuss the agreement with the available theoretical predictions.

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Classification de Session: Poster session

Classification de thématique: Nuclear Physics