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A nuclear inelastic and nuclear forward scattering study of $\mathbf{Eu_8Ga_{16}Ge_{30}}$ RAPHAËL P. HERMANN[1], VEERLE KEPPENS, Materials Science and Engineering, The University of Tennessee, USA, FERNANDE GRANDJEAN, Dept of Physics, University of Liege, Belgium, OLAF LEUPOLD, RUDOLF RÜFFER, ESRF, Grenoble, France, GEORGE S. NOLAS, Dept of Physics, University of South-Florida, USA, GARY J. LONG, Dept of Chemistry, University of Missouri-Rolla, USA — The type-I filled germanium clathrates contain "rattling" atoms in oversized atomic cages. This rattling provides the phonon glass behavior required for efficient thermoelectric materials. We have investigated the lattice dynamics in these compounds by nuclear inelastic scattering on ^{151}Eu in $Eu_8Ga_{16}Ge_{30}$ and obtained the weighted partial phonon density of states for the europium guests. Einstein oscillator energies of 3.8±0.3 and 6.7±0.2 meV have been obtained for the europium guests in the larger and smaller cages, respectively. The nuclear forward scattering measurements have yielded information about the magnetic behavior of the europium guests and provide insight in the tunneling dynamics of the guest located in the larger cage. These results will be compared to resonant ultrasound spectroscopy measurements. [The European Synchrotron Radiation Facility is acknowledged for provision of synchrotron radiation facility at the beamline ID22n, the RUS work was supported by the National Science Foundation]

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