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CUORE Installs Minus K Technology's 'Negative-Stiffness' Vibration Isolators For One-Ton Cryogenic Detector

Italy's National Institute of Nuclear Physics (INFN) has installed three custom vibration isolators for experiments within the Cryogenic Underground Observatory for Rare Events (CUORE), located within Gran Sasso mountain, the highest peak in the Apennines about 100 km (62 miles) from Rome.

CUORE is a detector for neutrinoless double-beta decay and other rare events such as detection of dark matter like axions or weakly interacting massive particles (WIMPs). The new generation one-ton scale cryogenic detector will have a total mass of about 1,500 kg (3,300 pounds) and must be cooled to less than 10 mK (millikelvin) in a vibration-free environment. The cryostat is isolated by a two-stage isolation system. The first stage is by the low-frequency Minus-K isolators using patented Negative-Stiffness Mechanism (NSM) technology. The second isolation stage is provided by regular springs at the top end of the suspension bars.

"These isolators were not only made to isolate at 0.5 Hz, but they had to withstand a seismic shock while under load," says Dr. David Platus, inventor of Negative-Stiffness Mechanism vibration isolation. "The NSM isolators offer better isolation performance than air or active isolation systems."

Collaborators on the CUORE project includes a consortium of members from UC Berkeley, UCLA, Livermore Lab, Berkeley Lab, Cal Poly, University of Wisconsin, University of South Carolina, University of Milan-Bicocca, University of Florence, Leiden University, University of Zaragoza, University of Rome, University of Genoa, University of Insubria, University of Padua, National Institute Nuclear Physics (INFN), National Laboratory of Legnaro and Gran Sasso National Laboratory in Italy. Minus K Technology works with many aerospace and education laboratories for custom vibration isolation systems. It offers a line of standard bench top, table and floor platform vibration isolation products. The company was founded in 1993 to develop, manufacture and market state-of-the-art vibration isolation products based on its patented Negative-Stiffness technology. Minus K is based in the Los Angeles area.

For more information, visit www.minusk.com.

SOURCE: Italy's National Institute of Nuclear Physics