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AMoRE: A neutrinoless double beta decay experiment

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The AMoRE (Advanced Molybdenum based Rare process Experiment) is looking for neutrinoless double beta decay of Mo-100 in molybdate based crystal scintillators by using a cryogenic technique. The crystals equipped with MMC (Metallic Magnetic Calorimeter) phonon and photon sensors are cooled down to 10~20 mK temperatures to detect both thermal and scintillation signals produced by a particle interaction in the crystal to achieve high energy resolution and efficient particle discrimination. The AMoRE-pilot, an RD phase, has six 48depl Ca 100 MoO 4 crystals with a total mass of ~1.9 kg in the latest configuration and is running at the 700-m-deep YangYang underground laboratory. After the completion of the AMoRE-pilot run by autumn this year, the AMoRE-I will start with ~5 kg of crystals, mostly 48depl Ca 100 MoO 4 and several RD crystals such as Li 2 100 MoO 4 and Na 2 100 MoO 7 . The AMoRE-II with 200 kg of molybdate crystals at the new 1,000 m deep underground laboratory (Yemi Lab) to be excavated by 2020 at Handeok iron mine can improve effective Majorana neutrino mass sensitivity down to the level of inverted hierarchy of neutrino mass, 20-50 meV. We have already secured 70 kg of Mo-100 isotope out of 120 kg contracted
for the AMoRE-II experiment. Results of the AMoRE-pilot and status of the AMoRE-I and AMoRE-II preparation will be presented.

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