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Octupole corelations in the neutron-deficient plutonium isotopes

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In this Letter of Intent, we propose an experiment to study the onset of octupole correlations in the neutron-deficient plutonium ($Z = 94$) isotopes. Specifically, we will identify and study excited states in the isotopes ^{232,234}Pu nuclei, for which there is no known information. The nuclei of interest will be populated using multinucleon transfer reactions. One possibility is to use a beam of $^{112}_{50}$Sn at 550 MeV on a target of $^{238}_{92}$U; the cross sections for these reaction channels have been calculated to be 0.02 (^{232}Pu) and 0.4 mb (^{234}Pu). We will use the AGATA γ-ray spectrometer, in conjunction with the DANTE charged-particle detector array and the PRISMA spectrometer. We will search for low-lying negative-parity states and E1 transitions in the level schemes of the nuclei of interest, which are indicative of octupole correlations. The experiment will require 14 days of beamtime.

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