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## Development of deformation in the Island of inversion at N=20 AGATA-PRISMA

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By bombarding a  $^{232}\text{Th}$  target with a  $^{36}\text{S}$  beam we aim to populate, via multi-nucleon transfer and deep-inelastic reactions, yrast and yrare states in neutron-rich isotopes in order to explore the new region of deformation and the doorway states that give rise to the island of inversion (IoI) at  $N = 20$ . The coupling of the AGATA array to the Prisma spectrometer will allow to map the boundaries of the IoI at  $N = 20$  and its possible extension towards  $N = 28$ . It will be possible to extend up to 6 units of angular momentum above the g.s.. Moreover, it will be possible to cover some notable gaps left from previous experiments such as  $^{35}\text{P}$ , to be extended from  $7/2^-$  up to  $13/2^-$  and  $^{34}\text{Si}$  for which we will observe for the first time the  $4^+$  and the  $6^+$  states. With this experiment we will investigate in this exotic region the shape coexistence and the robustness of the quadrupole collectivity with increasing excitation energy and angular momentum.

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