

## **Nuclear structure at N = 29: The structure of $^{47}\text{Ar}$ and first spectroscopy of $^{45}\text{S}$**

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Comprehensive spectroscopy of the N = 29 nucleus  $^{47}\text{Ar}$  is presented, based on two complementary fast-beam direct reactions: one-neutron pickup onto  $^{46}\text{Ar}$  projectiles and one-proton removal from the  $1^-$  ground state of  $^{48}\text{K}$ . The results are confronted with configuration-interaction shell-model calculations that use the state-of-the-art SDPF-U and SDPF-MU effective Hamiltonians. Also, from the  $^9\text{Be}(^{46}\text{Cl}, ^{45}\text{S}+\gamma)\text{X}$  one-proton-removal reaction, the first  $\gamma$ -ray transitions observed from  $^{45}\text{S}$  are reported. By using comparisons with shell-model calculations, and from the observed intensities and energy sums, a first tentative level scheme for  $^{45}\text{S}$  is proposed.