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Single-particle structure of 55Ti and 57Ti

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Beyond the new magic number N = 34, the region around the neutron-rich Ca isotopes, continues to attract a lot of attention. Recently, the energy of the first 2+ state of 56Ca was measured to have an unexpectedly high value [ChePC]. The excitation energies of the 2+ states of the N = 34 nuclei 56Ti and 52Ar indicate that the shell closure occurs only at and below Ca [Liu]. To clarify the evolution of the single-particle structure of N = 34 and N = 36 nuclei, we propose to perform the spectroscopy of 55Ti and 57Ti via one-neutron knockout reactions.
Parallel momentum distributions will allow us to determine the spin-parity of the populated states. This will clarify the ordering between f5/2 and p1/2 orbitals, which is pointed out by [Ste13], and investigate the transition into the island of inversion at N = 40.

[ChePC] S. Chen, et al., private communication.
[Liu19] H. Liu, et al., Phys. Rev. Lett. 122, 072502 (2019).
[Ste13] D. Steppenbeck, et al., Nature 502, 207-210 (2013).

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