

# HIGH SPIN STUDIES OF N~Z NUCLEI IN THE MASS 70 REGION\*

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In recent years there has been great interest in the structure of nuclei with equal or approximately equal numbers of protons and neutrons. This is primarily because studies of the heaviest N=Z nuclei are expected to provide important information on the  $np$  pairing interaction. N~Z nuclei in the A~70 region are also interesting since they have been found to exhibit shape co-existence between near-degenerate well deformed oblate and prolate shapes. Studies of odd mass nuclei in this mass region allow detailed investigations to be made of the nuclear shapes and of alignment blocking effects and the subsequent destruction of pairing correlations at high spins.

In the present work we have investigated the high spin structure of  $^{72}\text{Kr}$  using the  $^{40}\text{Ca} + ^{40}\text{Ca}$  reaction at 164 MeV and  $^{73}\text{Kr}$  using the  $^{36}\text{Ar} + ^{40}\text{Ca}$  reaction at 145 MeV and the former reaction at 160 MeV. The experiments were carried out using various combinations of GAMMASPHERE, MICROBALL and the neutron shell. In  $^{72}\text{Kr}$  we have evidence for a second high spin structure in addition to the original structure reported by Fischer et al [1]. This will be discussed and compared to the results of various model calculations. In  $^{73}\text{Kr}$  the three previously known bands [2] have been extended up to high spin. The interesting features here are that in the negative parity bands the anticipated double  $g_{9/2}$  proton and neutron alignment does not account for the observed data. Furthermore, the observation of crossover transitions at low spin in both the negative parity bands and between the known positive parity band and a potential new signature partner, indicate that all the structures are prolate. The results will be discussed in terms of various mean-field calculations.

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1. S.M. Fischer *et al.*, Phys. Rev. Lett., 87 (2001) 132501.
2. S. Freund *et al.*, Phys. Lett. B 302 (1993) 167.