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## (online) Shape coexistence in $^{52}\text{Cr}$ : lifetime measurement of the $0_2^+$ and the $4_1^+$ states

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Coexistence between spherical and deformed shapes is largely found in and near semi-magic or doubly-magic nuclei.

The region between the doubly-magic  $^{48}\text{Ca}$  and  $^{56}\text{Ni}$  nuclei is predicted to present phenomena of shape coexistence, although experimental information on E0 and E2 transition strengths connecting deformed and spherical configurations remains rather limited. In  $^{52}\text{Cr}$  ( $Z = 24$ ,  $N = 28$ ), a recent measurement of the  $X(E0/E2)$  ratio between the deformed  $0_2^+$  state and the spherical  $0_1^+$  and  $2_1^+$  states suggests that sizeable E0 strengths are indeed present. However, the determination of the  $\rho^2(E0)$  value—crucial to characterizing the nature of shape coexistence in this nucleus—requires a measurement of the lifetime of the excited state.

A lifetime measurement of  $^{52}\text{Cr}$  was carried out at the Legnaro National Laboratories using the  $\gamma$ -ray tracking array AGATA, coupled to the charged-particle detector SPIDER, with the nucleus of interest populated via a two-neutron transfer reaction. We will present the status of the ongoing analysis together with preliminary results concerning the  $4_1^+$  state.

**Auteurs:** PIGLIAPOCO, Sara (UniPD and INFN-PD); Dr GALTAROSSA, Franco (INFN-PD); Dr GOTTARDO, Andrea (INFN-LNL)

**Orateur:** PIGLIAPOCO, Sara (UniPD and INFN-PD)

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