Lifetime measurements for neutron-rich nuclei around ^{48}Ca populated in grazing reaction.

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Nowadays it has became clear that the magic numbers are not immutable and they can change as a function of the isospin, due to the influence of the residual interaction between valence orbitals [1]. Such a structural change in neutron-rich nuclei is verified in the appearance of the N = 32 subshell closure in nuclei located just above the doubly-magic ^{48}Ca and this can be inferred by different experimental hints [2].
The B(E2) reduced transition probability, which can be derived from lifetime measurements, is complementary to the energy information and is expected to be small and comparable with single-particle estimates going towards shell closures. For the calcium isotopic chain, the spectroscopic information is nevertheless limited to the energies of the excited states, especially in the neutron-rich part, and almost no lifetime information is available.

Based on this an experiment has been performed at Laboratori Nazionali di Legnaro, using the CLARA-PRISMA set-up [3, 4] in combination with the RDDS method [5]. The nuclei around ^{48}Ca have been populated via Multi Nucleon Transfer (MNT) reaction and their lifetimes determined. The B(E2) extracted for the $2^+ \rightarrow 0^+$ and $11/2^- \rightarrow 7/2^-$ transitions in ^{50}Ca and ^{51}Sc respectively have been compared with large-scale shell-model calculations. The *fp* effective charge have been extracted from ^{50}Ca and ^{51}Sc because of their ideal position, two-neutrons and two-neutrons one-proton with respect to ^{48}Ca nucleus, in this region.
The experimental method, the results and their interpretation will be presented and discussed.

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