Pairing effects on the collectivity of quadrupole states around $^{32}$Mg

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abstract The first $2^+$ states in $^{N=20}$ isotones including neutron-rich nuclei $^{32}$Mg and $^{30}$Ne are studied by the Hartree-Fock-Bogoliubov plus quasiparticle random phase approximation method based on the Green's function approach. The residual interaction between the quasiparticles is consistently derived from the hamiltonian density of Skyrme interactions with explicit velocity dependence. The transition probabilities and the excitation energies of the first $2^+$ states are well described within a single framework. We conclude that pairing effects account largely for the anomalously large $\text{B(E2)}$ value and the very low excitation energy in $^{32}$Mg.