Kepler's first view of O-star variability: K2 data of five O stars in Campaign 0 as a proof-of-concept for O-star asteroseismology

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We present high-precision photometric light curves of five O-type stars observed with the refurbished {it Kepler/} satellite during its Campaign 0. For one of the stars, we also assembled high-resolution ground-based spectroscopy with the {sc hermes} spectrograph attached to the 1.2-m Mercator telescope. The stars EPIC202060097 (O9.5V) and EPIC202060098 (O7V) exhibit monoperiodic variability due to rotational modulation with an amplitude of 5.6 mmag and 9.3 mmag and a rotation period of 2.63 d and 5.03 d, respectively. EPIC202060091 (O9V) and EPIC202060093 (O9V:pe) reveal variability at low frequency but the cause is unclear. EPIC202060092 (O9V:p) is discovered to be a spectroscopic binary with at least one multiperiodic Î²Cep-type pulsator whose detected mode frequencies occur in the range [0.11,6.99] dâˆ'1 and have amplitudes between 0.8 and 2.0 mmag. Its pulsation spectrum is shown to be fully compatible with the ones predicted by core-hydrogen burning O-star models. Despite the short duration of some 33,d and the limited data quality with a precision near 100 Î¼mag of these first K2 data, the diversity of possible causes for O-star variability already revealed from campaigns of similar duration by the MOST and CoRoT satellites is confirmed with {it Kepler}. We provide an overview of O-star space photometry and give arguments why future K2 monitoring during Campaigns 11 and 13 at short cadence, accompanied by time-resolved high-precision high-resolution spectroscopy opens up the possibility of in-depth O-star seismology.

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