KARMENES: The K2+CARMENES short cadence search of M dwarfs as hosts of close-in planets and pulsations

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We propose high-cadence observations of a selection of 11 (6) nearby M dwarfs in Field 4 (5) from the CARMENES spectrograph input catalog (CARMENCITA) and the MEarth survey catalog with the aim of detecting ultra-short period planets with orbital periods of only a few hours, and pulsations predicted to be in the 20 minutes to 3 hours range. Time-series analysis techniques will be used to accomplish our goals. The high cadence choice is non-negotiable to discover the theoretically predicted pulsations, which would enable the precise characterization of the M dwarfs inner structure and age, the Holy Grail of M dwarfs. This proposal perfectly addresses some of the K2 Science Motivations: 1/ the characterization of the internal structure and fundamental properties of stars using the tools of asteroseismology and 2/ goes a step further in providing small planets around bright and small stars to facilitate precise follow-up; even if some of the targets are faint in the optical, CARMENES still will be capable of doing the follow-up, as the targets emit more flux in the nIR, resulting in a fruitful alliance between K2 mission and CARMENES.