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The CHEOPS mission

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Abstract. Ground based radial velocity (RV) searches continue to discover exoplanets below Neptune mass down to Earth mass. Furthermore, ground-based transit searches now reach milli-mag photometric precision and can discover Neptune size planets around bright stars. These searches will find exoplanets around bright stars anywhere on the sky, their discoveries representing prime science targets for further study due to the proximity and brightness of their host stars. A mission for transit follow-up measurements of these prime targets is currently lacking. The first ESA S-class mission CHEOPS (CHaracterizing ExoPlanet Satellite) will fill this gap. It will perform ultra-high precision photometric monitoring of selected bright target stars almost anywhere on the sky with sufficient precision to detect Earth-sized transits. It will be able to detect transits of RV-planets by photometric monitoring if the geometric configuration results in a transit. For Hot Neptunes discovered from the ground, CHEOPS will be able to improve the transit light curve so that the radius can be determined precisely. Because of the host stars' brightness, high precision RV measurements will be possible for all targets. All planets observed in transit by CHEOPS will be validated and their masses will be known. This will provide valuable data for constraining the mass-radius relation of exoplanets, especially in the Neptune-mass regime. During the planned 3.5 year mission, about 500 targets will be observed. There will be 20% of open time available for the community to develop new science programmes.