



Contribution ID: 108 Contribution code: S4 High Energy and Particle Physics  
Presentation

Type: Oral

## The potential scientific capabilities of the Evanescent Wave Coronagraph EvWaCo

*Friday, June 24, 2022 3:30 PM (15 minutes)*

The Evanescent Wave Coronagraph, EvWaCo, is an in-development prototype coronagraph, designed for use on the 2.4m Thai National Telescope (TNT), in the R and I-band filters. This work examines the astronomical capabilities of EvWaCo using the results from Fourier-analysis simulations. The coronagraph mask comprises a spherical lens placed in contact with a prism, utilising the principle of frustrated total internal reflection. On-axis light is transmitted through prism and the lens, whereas off-axis light is totally internally reflected within the prism, producing the mask's coronagraphic properties. Fourier optics simulations were applied to the EvWaCo prototype to analyse its performance, combining different sources of contrast degradation that will be present in the system. The simulations used for the main analysis assume a good night at the Thai National Observatory (TNO) and include the fitting error, aliasing and wave-front noise, providing a radially averaged contrast curve. From the contrast curve, the detection limit, as defined by a minimum signal to noise ratio of 5 for a typical observation time, can be calculated for different primary star magnitudes. The relative fluxes of various binary stars, with a range on spectral classes and separations, were modelled allowing comparison to the EvWaCo detection curves. The photon-noise limited detection curves provide a theoretical baseline for the performance that will be achieved with EvWaCo; they therefore give an indication of the types of objects EvWaCo can observe. Along with a broader discussion of observable objects, some potential known candidates for observations on the TNT using EvWaCo are suggested.

**Primary author:** RIDSDILL-SMITH, Matthew (NARIT)

**Co-authors:** Dr BERDEU, Anthony (NARIT); Dr BUISSET, Christophe; Ms ALAGAO, Mary Angelie (NARIT); AW-IPHAN, Supachai (NARIT, Thailand)

**Presenter:** RIDSDILL-SMITH, Matthew (NARIT)

**Session Classification:** S4 High Energy and Particle Physics

**Track Classification:** High Energy and Particle Physics