

## Insight from laboratory measurements on dust in debris discs

Extreme adaptive optics instruments have revealed exquisite details on debris discs, allowing to extract the optical properties of the dust particles such as the phase function, the degree of polarisation and the spectral reflectance. These are three powerful diagnostic tools to understand the physical properties of the dust population : the size, shape and composition of the dust particles. This can inform us on the population of parent bodies, also called planetesimals, which generate those particles through collisions.

It is however very rare to be able to combine all those three observables for the same system, as this requires different high-contrast imaging techniques to suppress the starlight and reveal the faint scattered light emission from the dust. Due to its brightness, the ring detected around the A-type star HR4796 is a notable exception, with both unpolarized and polarized images covering the optical and near-infrared wavelengths. In this contribution we will present new scattered light images of the disc in the optical and near-infrared obtained with VLT/SPHERE and show recent measurements on dust particles in the laboratory able to reproduce the observed properties. Experimental characterisation of dust allows to bypass the current limitations of dust models to reproduce simultaneously the phase function, the degree of polarisation and the spectral reflectance. By controlling the sample in composition or size we also can provide additional constraints on the dust properties and we studied the effect of space weathering to reproduce the red reflectance of the dust.

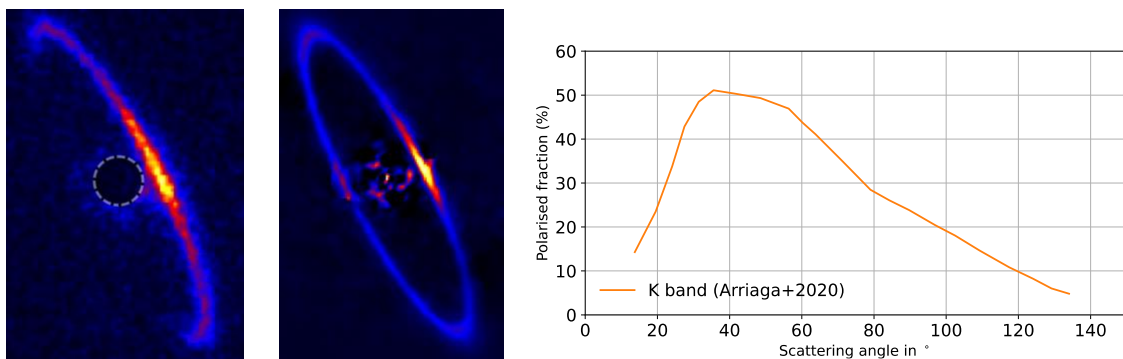


Figure 1: The disc around HR4796, observed in polarised (left) and total intensity (middle) near-infrared light with the GPI and VLT/SPHERE instruments respectively. Right: degree of linear polarisation extracted from these images

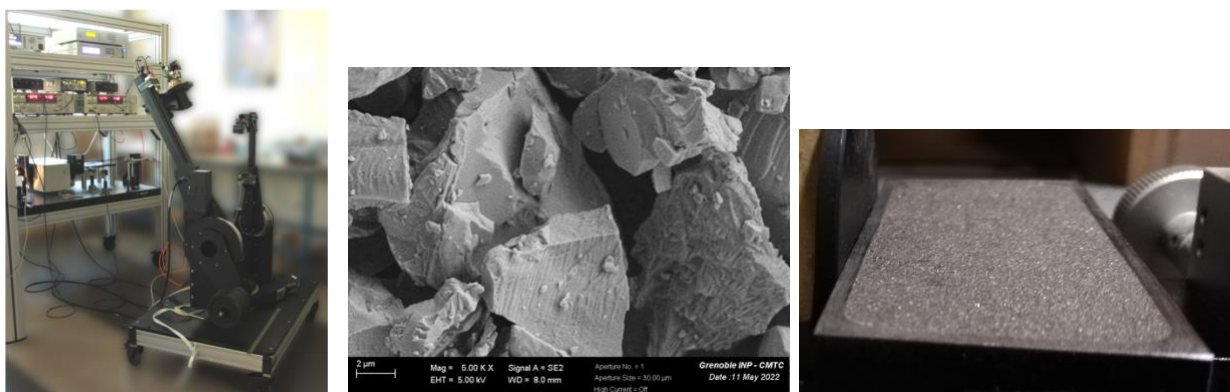


Figure 2. Left: The SHADOWS instrument currently in operation at IPAG. Middle and right: Iron sulphide sample measured with SHADOWS and compatible with the scattering properties of the HR 4796 disc.