INTERSTELLAR DUST AND MAGNETIC FIELDS: THE IMPORTANCE OF MULTI-WAVELENGTH POLARIZATION IN THE FUTURE OF ASTRONOMICAL RESEARCH

Interstellar dust, a collection of (mostly) sub-micron silicate and carbon grains, is a key component in modern astrophysical observations despite being a relatively obscure topic. The spectral energy distribution (SED) of dust emission is one of the most used tracers of the interstellar medium (ISM) and allows to measure things such as the local density, temperature, or the integrated mass of interstellar clouds. In another example, the polarization of dust emission traces the direction of interstellar magnetic fields. The observation of dust provides key data in topics ranging from star formation to cosmology.

However, our understanding of dust – and therefore of all the topics connected to it – is still limited. How variable are the properties of dust? To what point do these variations influence our interpretation of observations? An example of open question is how to extract information from the degree of polarization of dust emission, which depends on many variables – including the structure and orientation of the magnetic field, the orientation of dust grains, and the properties of dust itself.

In this talk I am going to explain how the analysis of polarization at multiple wavelengths can help us break this degeneracy and better constrain the properties of interstellar dust. In my current work as part of the BISTRO project (B-fields In Star-Forming Region Observations), I am reconstructing the polarized SED of the N2071 interstellar cloud at wavelength between 100 and 1000 μm, as a first step toward a better understanding of dust, and its evolution, in star-forming regions.