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Probing the role of the magnetic field in star-forming filaments: NIKA2-Pol commissioning results on OMC-1

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Dust polarization observations are a powerful, practical tool to probe the geometry (and to some extent the strength) of magnetic fields in star-forming regions. In particular, Planck polarization data have revealed the importance of magnetic fields on large scales in molecular clouds. However, due to insufficient resolution, Planck observations are unable to constrain the B-field geometry on prestellar and protostellar scales. The high angular resolution of 11 arcsec provided by NIKA2-Pol 1.2 mm polarimetric imaging, corresponding to ~0.02 pc at the distance of the Orion cloud (OMC), makes it possible to advance our understanding of the B-field morphology in star-forming filaments and dense cores (IRAM 30m large program B-FUN).
The commissioning of the NIKA2-Pol instrument has led to several challenging issues which will be briefly addressed in the first part of the proposed presentation. In particular, we will present our current understanding of the instrumental polarization or intensity-topolarization "leakage" effect with NIKA2-Pol. We will show how this effect can be corrected for, leading to reliable exploitable data in a structured extended source such as OMC-1. We will present a statistical comparison between NIKA2-Pol and SCUBA2-Pol2 results in the OMC-1 region. We will also present tentative evidence of a local hourglass pattern centered on Orion-KL, in addition to a large-scale hourglass already seen by other instruments such as Pol2. Finally, we will discuss new estimates of the B-field strength in the OMC-1 region based on, e.g., the Davis-Chandrasekhar-Fermi (DCF) and structurefunction methods applied to NIKA2-Pol data, along with their associated limitations.

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