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Infrared Polarization View of the Orion Nebula Revealed with SIRPOL

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SIRPOL is the polarimetry mode of the JHKs band simultaneous infrared camera SIRIUS mounted on the 1.4-m IRSF telescope in South Africa, which is available from 2005 December. The instrument is among the first ones that provide deep and wide-field infrared polarimetric images, which can in principle measure polarizations of all the 2MASS-detected sources within a field-of-view of $7.7' \times 7.7'$ in the JHKs bands simultaneously with $\leq 1\%$ polarization accuracy.

Our wide and deep near-infrared polarization images of the well known Orion Nebula (M42) contains a wealth of information, including: a very extended bipolar IRN, illuminated by a cluster of stars; several other, smaller-scale, IRN systems around less-massive young stars including the famous optical source θ^2 Ori C; and a number of unresolved systems around young stars and brown dwarfs showing possible intrinsic polarizations. Moreover, the distinctive linear feature, known as the Bright Bar, is striking in the polarization images, with scattering from dust ~ 0.02 pc behind the ionization front. Thus, wide-field polarimetry is demonstrated to be very effective in seeing through intervening dust and ionized gas emission and establishing the underlying morphology with much greater contrast.