P162a Near-infrared Circular Polarization Survey in Star-forming Regions: 4

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Polarimetry is a crucial tool for studying the physical processes in the interstellar medium, including star-forming regions. Especially, circular polarization (CP) is an important astronomical tool not only to study circumstellar structures but also to act as a potential surface biosignature on (exo)planets. We have been conducting a systematic near-infrared CP survey from high-mass to low-mass star-forming regions, using the SIRPOL imaging polarimeter on the InfRared Survey Facility (IRSF) 1.4-m telescope at the South African Astronomical Observatory. In our previous studies, the results have showed for the first time the universality of CP in star and planet forming regions. In this presentation, we report the first detection of CP in the reflection nebula associated with the massive star forming region AFGL 6366S in the Gemini OB1 molecular cloud complex, which is in the anti-galactic center region. The CP region is probably illuminated by the IRAS/WISE source and its polarization is amplified by the dichroic absorption of the dense core, which is associated with the cluster. This is the ninth source whose degrees of CPs are measured to be greater than 3%, suggesting that large and extended infrared CP regions are common among mid- to high-mass young stellar objects.