

IAF SPACE EXPLORATION SYMPOSIUM (A3)
Interactive Presentations - IAF SPACE EXPLORATION SYMPOSIUM (IP)Author: Ms. Shaifali Garg
Indian Institute of Remote Sensing, IndiaPOLARSAR-BASED CHARACTERISATION OF THE LUNAR SURFACE USING CHANDRAYAAN-2
DFSAR DATA**Abstract**

Lunar research holds immense significance in advancing our understanding of celestial bodies. This thesis explores how Polarimetric Synthetic Aperture Radar (PolSAR) analysis can be used to characterize the lunar surface. The main goal is determining the lunar surface's dielectric constant, a crucial variable for comprehending its ice traps and other volatiles. The progression of lunar research has been constrained by the lack of fully polarimetric data, with only S-band data accessible until the advent of Chandrayaan-2. This scarcity created a research gap, a challenge this study addresses by harnessing the full polarimetric (fullpol) and additional L and S-band data from Chandrayaan-2. Two craters were chosen: Nobile with the PSR ID: $SP_842890_0563440$ and Sverdrup with PSR ID : $SP_82490_2164550$. Along with these two craters, Taurus-Littrow Valley (Apollo 17 Landing Site) was also used to explore the DFSAR data released by Chandrayaan-2. Integral Equation Model (IEM) was used to achieve this. The Barnes decomposition (wavedichotomy-based decomposition) and H/A/Alpha decomposition (eigenvalue, eigenvector-based decomposition). These methods are then applied, leading to insightful results that effectively corroborate the output of ice traps.