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The solar PolARization and Directivity X-Ray Experiment (PADRE)

Solar flares are known to accelerate electrons to high energies efficiently. However, how the underlying acceleration mechanisms work remains poorly understood. The angular distribution of the accelerated electrons, the resultant hard X-ray emission, and its polarization and directional anisotropy are key to solving this mystery. The solar PolARization and Directivity X-Ray Experiment (PADRE) is a 12U Cubesat observatory developed to solve this mystery. PADRE will investigate the accelerated electron angular distribution in solar flares with two complementary approaches (1) by making spatially-integrated spectro-polarimetric X-ray measurements (~10-100 keV) and (2) by coordinating with Solar Orbiter/STIX to make the first two-point measurements of X-rays and determining their directivity. We present the PADRE observatory concept, its science objectives, design, and updates. We will discuss the observations its two instruments (SHARP and MeDDEA) will make.

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