

P138a BISTRO : 850 μm 偏波機能付き “SCUBA-3” カメラの製作 (1) 科学目標

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In the next several years, we pursue our ongoing studies toward the better understanding of (i) structure-formation process in molecular clouds with a spatial scale between 10 pc and 0.1 pc, (ii) trigger of protostar formation in molecular cloud cores (0.1 pc), (iii) role of “stellar feedback” by jets/outflows emanated from YSOs, and (iv) alignment mechanism of interstellar dust grains. Considering the goals achievable by the existing SCUBA-2 plus POL-2 system, we commenced planning a major upgrade of 850 μm continuum instrument with a capability of linear-polarization imaging. The new camera, hereafter “SCUBA-3”, will have a full field-of-view diameter of 12', twice as large as SCUBA-2. The focal plane will be filled with 3636 pixels, each of which will comprise two Microwave Kinetic Induction Detectors (MKIDs), measuring orthogonal linear polarization. Thus, “SCUBA-3” will allow determination of linear-polarization state from a single scan observation, without a rotating half-wave plate and fixed wire-grid analyzer to modulate incident polarized signal. This native observation of polarized signal, along with the improved capabilities of MKIDs over the Transition Edge Sensor bolometers used by SCUBA-2, will result in almost an order of magnitude enhancement in polarized intensity. “SCUBA-3” would expect to result in an order of increase in mapping speed in polarized light over the current system with an aspirational a few times ten increase. Major scientific goals with “SCUBA-3” will be discussed in the talk. The newly released White Papers, including the magnetic-field one, are available at <https://www.eaobservatory.org/jcmt/wp-content/uploads/sites/2/2019/11/EA0SubmmFuturesWPs.pdf>