CMB Polarization with MAXIPOL and POLARBEAR, and Sunyaev-Zel'dovich observations with APEX-SZ

M. Abroe[1], P. Ade[2], F. Bertoldi[3], J. Bock[4,5], J. Borrill[6], H.-M. Cho[7], J. Clarke[7], J. Collins[7], M. Dobbs[8], P. Ferreira[9], R. Guesten[3], S. Hanany[1], N. Halverson[7], W. Holzapfel[7], A. Jaffe[10], B. Johnson[1], E. Kreysa[3], T. Lanting[7], A.T. Lee*[7,8,11], T. Matsumura[1], J. Mehl[7], K. Menten[3], D. Muders[3], M. Myers[7], R. O'brient[7], B. Rabii[7], A. Ranccanelli3, P.L. Richards7,11, T. Renbarger3, P. Schilke3, D. Schwan7, G. Smoot[7,8,11], H. Spieler[8], R. Stompor[6], H. Tran[7], C. Winant[7], P. Wu[12]

[1]Physics Dept., University of Minnesota, Minneapolis, Minnesota
[2]Cardiff University, Cardiff, Wales
[3]Max Planck Institute for Radioastronomy, Bonn, Germany
[4]Jet Propulsion Laboratory, Pasadena, California
[5]California Institute for Technology, Pasadena, California
[6]NERSC, Lawrence Berkeley National Laboratory, Berkeley, California
[7]Physics Dept, University of California, Berkeley, California
[8]Physics Division, Lawrence Berkeley National Laboratory, Berkeley California
[9]Oxford University, Oxford, UK
[10]Imperial College, London, UK
[11]Space Sciences Laboratory, University of California, Berkeley, California
[12]National Taiwan University, Taipei, Taiwan

We will discuss the balloon-borne CMB polarization experiment MAXIPOL, which is an evolution of the MAXIMA CMB experiment. It uses a rotating half-wave plate to modulate the polarization signal onto 16 single-polarization bolometric photometers. The first scientific flight in planned for 2003.

The POLARBEAR experiment is a proposed ground-based experiment with sufficient sensitivity to characterize the E-mode and lensing B-mode polarization and perform a deep search for the possible gravity-wave B-mode signal. It will be deployed in stages eventually building to a 3000 element transition-edge sensor bolometer array with four frequency bands. The array will be built with planar-antenna coupled bolometers with on-wafer band-defining filters. Systematic error controls include two layers of full ground shields and multiple modulations of the sky signal.

The APEX-SZ experiment will search for galaxy clusters over ~100 sq. deg. of sky using a 300 element horn-coupled bolometer array and the 12m APEX telescope to be sited in Atacama Chile. Several thousand clusters should be discovered which will provide a powerful probe of cosmology. The bolometers will have spiderweb absorbers, transition-edge sensors, and SQUID preamplifiers.