Solar Patrol Polarization Telescopes at 45 and 90 GHz

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The spectra of solar flares provide important information about the physics involved in the flaring process. Presently, however, there is a large frequency gap at radio frequencies between 20 and 200 GHz. Unfortunately, this gap hinders the determination of important flare parameters such as: (i) the frequency of the peak of the spectra, or turnover frequency, which yields the magnetic field intensity in the flaring source and electron density; (ii) the optically thin frequency slope, that is related to the accelerated electrons with a power-law energy distribution, allowing information about the acceleration mechanism; (iii) and other physical parameters such as source size and inhomogeneities that may also be estimated from spectra with complete spectral coverage. Recently a new spectral component at high frequencies was discovered with fluxes increasing above 200 GHz, distinct from the traditional microwave component, with peak frequencies at about 10 GHz. To elucidate the nature of both components and fully characterize the spectra of solar flares, we analyze new observations at the intermediate frequencies obtained by two antennas with receivers at 45 and 90 GHz, capable of measuring circular polarization. The telescope, installed at CASLEO Observatory (Argentina), is described in detail. We also analyze the observations of the flares it has already detected, including their spectra especially when data at 212 and 405 GHz from the Solar Submillimeter Telescope (SST), located at the same site, is available.