V73c Slit Modulation Imaging Method for Radio Interferometer

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We propose slit modulation imaging (SMI) method, a new imaging technique for detecting shorter periodic structure changes from interferometric data. Using simulations with artificial visibility data, we show that the SMI method is quite effective for detecting shorter periodic change patterns than the whole observing time span from interferometric data. The essence of SMI method lies in the selection rule of visibility data in time series. SMI maps are obtained as follows. First we divide the whole observation time into several divisions with the trial period P_{trial} interval and next, the each division is divided into sub-divisions (n phase- segments) again. The first-phase SMI map is produced with visibilities from the first phase-segments of all the divisions. The second-phase SMI map is produced with visibilities from the second phase-segments of all the divisions. Namely, the n-th phase SMI map is produced from the visibilities of the n-th phase-segments of all the divisions. the SMI maps have very similar u-v coverage to each other, almost free from the influence of different u-v coverage. If the brightness distribution of the object is constant, and the signal to noise ratio is high, every phase map of SMI should be the same shape. For an object with periodic change of P_{change}, if the trial period of SMI P_{trial}, is equal or close to the P_{change}, it is expected that characteristic structure changes with the period will be enhanced and emerge onto the sequence of phase maps of SMI. Adding to the SMI method, we also introduce a Fourier analysis investigating the resultant SMI maps named as the Fourier Extraction of the Period method (FEP method).