IMAGE RECONSTRUCTION FROM VLBI AMPLITUDE AND PHASE CLOSURE DATA

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ABSTRACT

A two step procedure is developed for the determination of the angular structure of the compact components of radio sources from observations made with very long baseline interferometry (VLBI). The first step is to fit a model composed of circularly symmetric Gaussian components to the observations. Then this, or any other, model and closure phase information is used to predict visibility phases which, when paired with the corresponding visibility amplitude observation, are combined in a direct synthesis; the resulting map is deconvolved from the point source response by means of the "CLEAN" procedure. If necessary, the "cleaned" components can be used as a starting model to predict visibility phases and the process iterated. The initial model in many cases may be as simple as a point source. Convergence of this process appears to be quite rapid, requiring only a few iterations when the source is simple or the starting model is good. These two steps for source mapping can be used either together or separately. Examples are given using data generated from test models.