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Title:	Wide Field Imaging
Authors:	Gupta, Prashansa (/jspui/browse?type=author&value=Gupta%2C+Prashansa)
Keywords:	Physics Astronomy Interferometry
Issue Date:	5-Aug-2016
Publisher:	IISER-M
Abstract:	Interferometry has been used in radio astronomy for quite some time now, becoming an essential technique that makes high resolution imaging possible with radio telescopes. The existent mathematical framework for this relies heavily on the assumption of a small field of view and co-planarity of the array, and, a quasi-monochromatic regime in the form of the van Cittert Zernike theorem. Technological advances, however, have now made it possible to study large portions of the sky with a broader bandwidth, giving rise to the need to revisit the mathematics. There is a related complexity introduced by SKA, LOFAR like noncoplanar arrays, the so called w-term. Some of these issues can be tackled by using non-cartesian basis functions, for example, spherical harmonics. The aim of this thesis is to study generalizations of the existing methodologies to reduce or even remove the restrictive assumptions, taking the examples of the GMRT, OWFA, MWA telescopes.
URI:	http://hdl.handle.net/123456789/552 (http://hdl.handle.net/123456789/552)
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