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A step forward in goniopolarimetry with multi-component electric and magnetic radio measurements

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Goniopolarimetric techniques (also known as Direction-Finding) are making use of either electric or magnetic component measurements to deduce the observed electromagnetic wave parameters, which includes: flux density, polarization state, direction of k-vector, and sometimes the planarity of the wave front (from which we can get an estimate of the size of the source). Radio receivers such as Cassini/RPWS/HFR or STEREO/Waves provide goniopolarimetric measurement and thus allows the scientists to obtain rich data products that lead to high level science results. However, in some particular cases, these measurements cannot resolve specific ambiguities: (a) when close to the source it is not possible to derive the sense of propagation; (b) when close to the wave mode cutoff, the transverse propagation assumption (necessary with electric measurements) is not valid any more.

Future radio receivers developed for EJSM/JGO or proposed for the Alfvén-MICE project, will include simultaneous electric and magnetic component measurements. We present here how this instrumental setup provide enough additional information to get correct results in the two problematic situation presented above.