
Revealing 3D structures through Faraday rotation

Lawrence Rudnick^{*1}, Craig Anderson², Emma Alexander³, William D. Cotton⁴, and Alice Pasetto⁵

¹University of Minnesota – United States

²Australian National University – Australia

³University of Manchester – United Kingdom

⁴National Radio Astronomy Observatory – United States

⁵IRyA, UNAM – Mexico

Abstract

The Faraday spectrum encodes information about the integral of n^*B^*s from each synchrotron emitting region within the beam. In some circumstances, more frequently than has been previously recognized, we can recover the line of sight distance, s , to the emitting region, and thus the underlying 3D structure of the source. In this talk we will discuss how to recognize when the 3D structure can be recovered, whether from a full Faraday cube, or even from the simple 2D. polarized intensity, peakRM maps. A variety of scientifically important and previously unrecognized structures will be shown using data from different arrays. Signatures of Faraday features local to the radio source, as opposed to unrelated foreground fluctuations, can also be uncovered, and thus provide information about AGN/thermal medium interactions. There would be great value to utilize these techniques to reanalyse many of the Faraday maps already in the literature and revisit their corresponding scientific interpretations.

*Speaker