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Emily K Bice* (ebice@csu.fullerton.edu), **Venkata V Chebrolu**, **Huanzhou Yu**, **Jean H Brittain**, **Scott B Reeder** and **Angel R Pineda**. *Cramer-Rao Bound for Estimating Non-linear Parameters in a Model for Chemical Species Separation using Magnetic Resonance Imaging.*

Magnetic resonance images typically contain signals from multiple chemical species such as water and fat. The diagnostic information in the image can be improved by separating the components of the signal coming from individual chemical species. The model that describes the signal generation includes non-linear parameters which arise from imperfections in the magnetic field and signal decay. The Cramer-Rao Bound is the minimum variance of an unbiased estimator of a parameter. In this work, we use the Cramer-Rao Bound to optimize the data acquisition for the non-linear inverse problem of estimating the magnetic field inhomogeneities and signal decay. (Received September 21, 2009)