

# RECONSTRUCTION OF HYPERFINE FIELDS DISTRIBUTIONS BY THE MAXIMUM ENTROPY METHOD

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## Abstract

The reconstruction of the hyperfine field distributions from the Mossbauer spectra is a difficult task because one tries to retrieve information about a 2- or 3-dimensional object from a single one-dimensional spectrum. In conventionally accepted procedures one has to make many simplifying assumptions in order to get this kind of information. In particular one has to assume the existence of certain correlations between the parameters: the intensity of the hyperfine field, B, quadrupole splitting, QS, and isomer shift, IS. In our paper [1] it was shown that one can successfully obtain the (B,IS) distributions even when a uniform prior is used. However, as demonstrated hereafter, this task turns out to be more difficult in the case of paramagnets, for which QS and IS distributions only can be considered. In this case one deals with a great many possible solutions and MaxEnt algorithm is not selecting the intuitively expected one. This so-called ambiguity problem can be solved only when a non-uniform prior is used. This same necessity of a using non-uniform prior exists when retrieving 3-dimensional, i.e. (B,QS,IS) distributions, but we show in the present work that in both considered cases one can devise an efficient strategy and achieve physically valuable results.

1.L.Dobrzynski, K.Szymanski, D.Satuna, "Maximum Entropy Method in Mossbauer Spectroscopy", Nukleonika 49, Suppl. 3 (2004) S89

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