EMPIRICAL MODELING OF THE SOLAR CORONA USING GENETIC ALGORITHMS

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Abstract

Nonlinear inverse problems are common to astronomy, and can present formidable analytic tasks with sometimes inconclusive results. In some cases the difficulties arising from nonlinearity or smoothing properties of the integral operator are severe enough to warrant repeated evaluations of the forward problem as an alternate approach. Because a forward approach is intrinsically repetitive and time consuming, an efficient and flexible forward technique is a great advantage. We show how a forward technique that utilizes genetic algorithms allows us to fit magnetostatic models of the solar minimum corona to observations in white light to a degree that would otherwise have been computationally prohibitive.