Primordial Origin of Composite Magnetic Configurations in Spiral Galaxies

Y. Sofue[1,2], M. Machida[3], T. Kudoh[4] (1.Meisei Univ., 2. U .Tokyo,,3. Kyushu Univ. 4.NAOJ)

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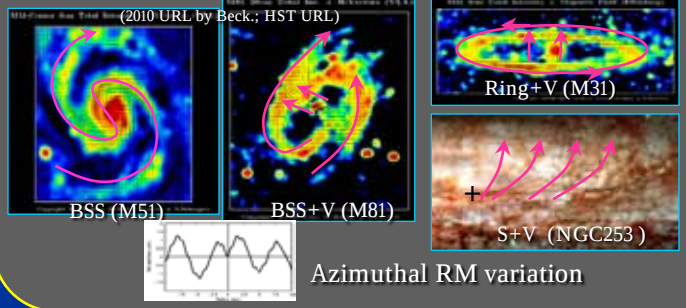
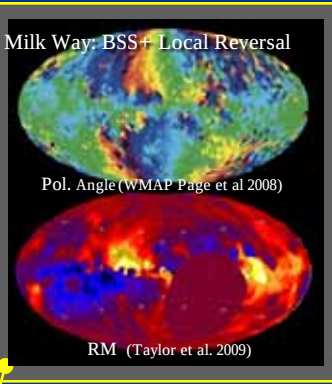
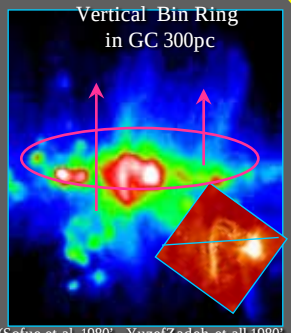
Abstract

Observations indicate composite magnetic fields in galaxy disks, comprising S (BSS), A (ASS) , R (Ring), GPR(Gal. plane reversal) in disks, and V (Vertical) in the center. These different configurations co-existing in one galaxy are explained as the fossil of large scale primordial field wound up during galaxy formation, and are well reproduced by MHD simulations. SKA High-resolution and sensitive Faraday RM mapping will clarify the detailed S, A, R, GPR and V field configurations, which gives constraints on the seed cosmological magnetic field.

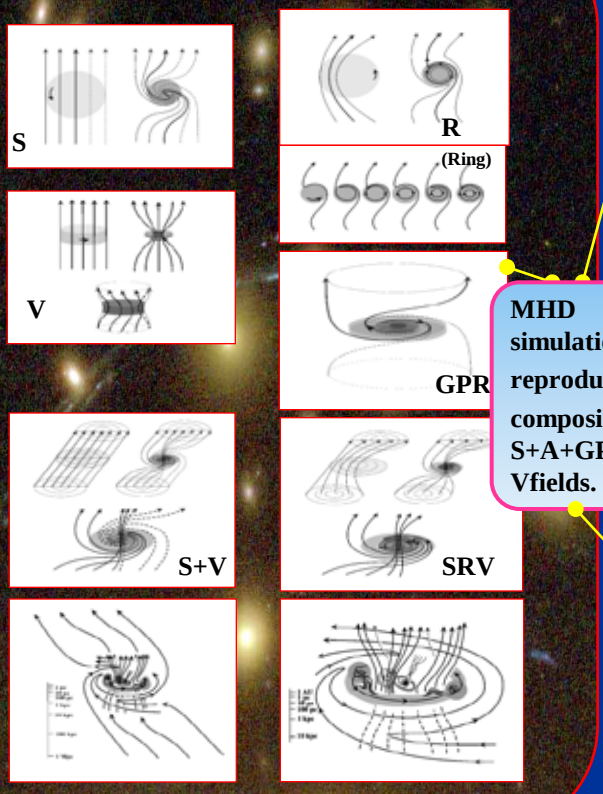
1. Observed S, A, R, GPR,V fields





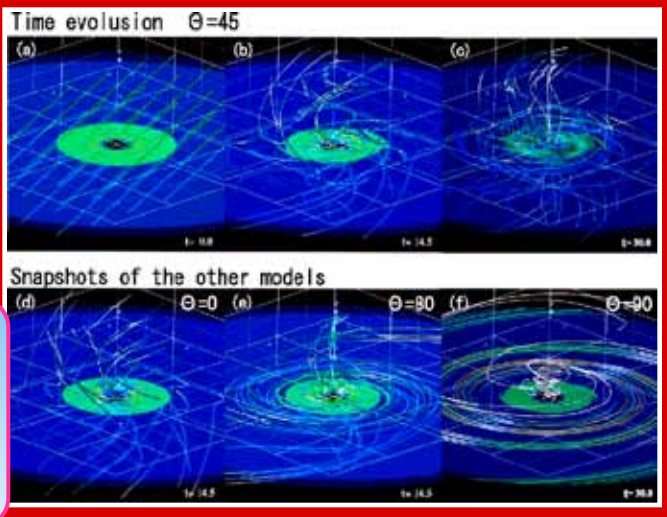


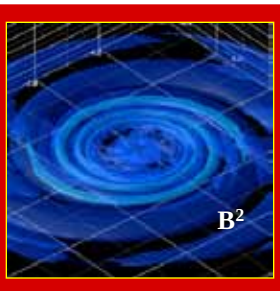
2. Creation of Composite B



MHD simulation reproduces composite S+A+GPR+ Vfields.

3. MHD Simulation





(Sofue, Machida, Kudoh 2010, PASJ)