

PRIMORDIAL MAGNETIC FIELDS AND THE MATTER POWER SPECTRUM

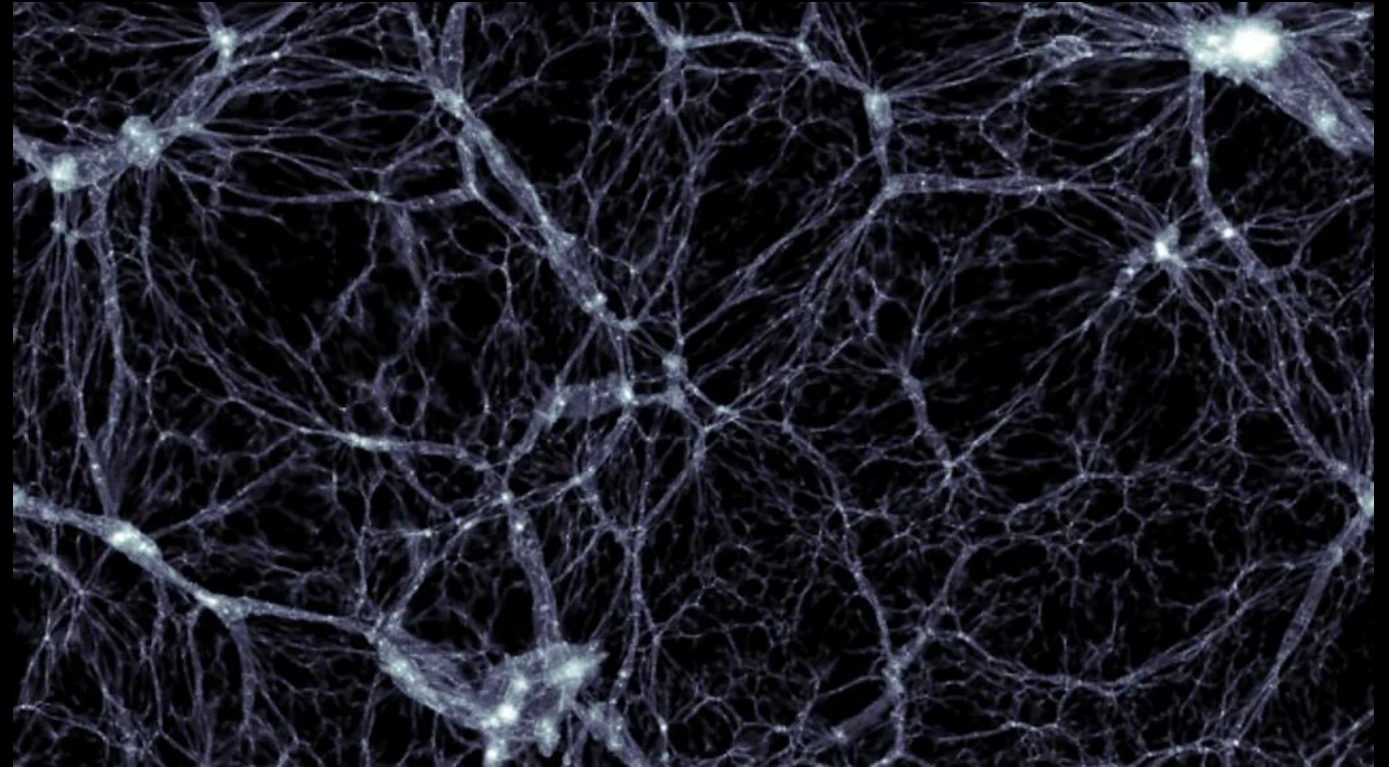
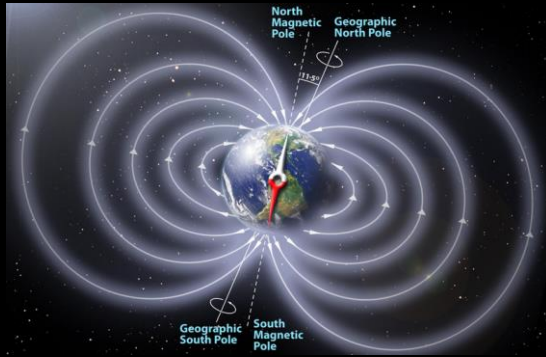
Phys. Rev. Lett. 131, 231002

Pranjal Ralegankar

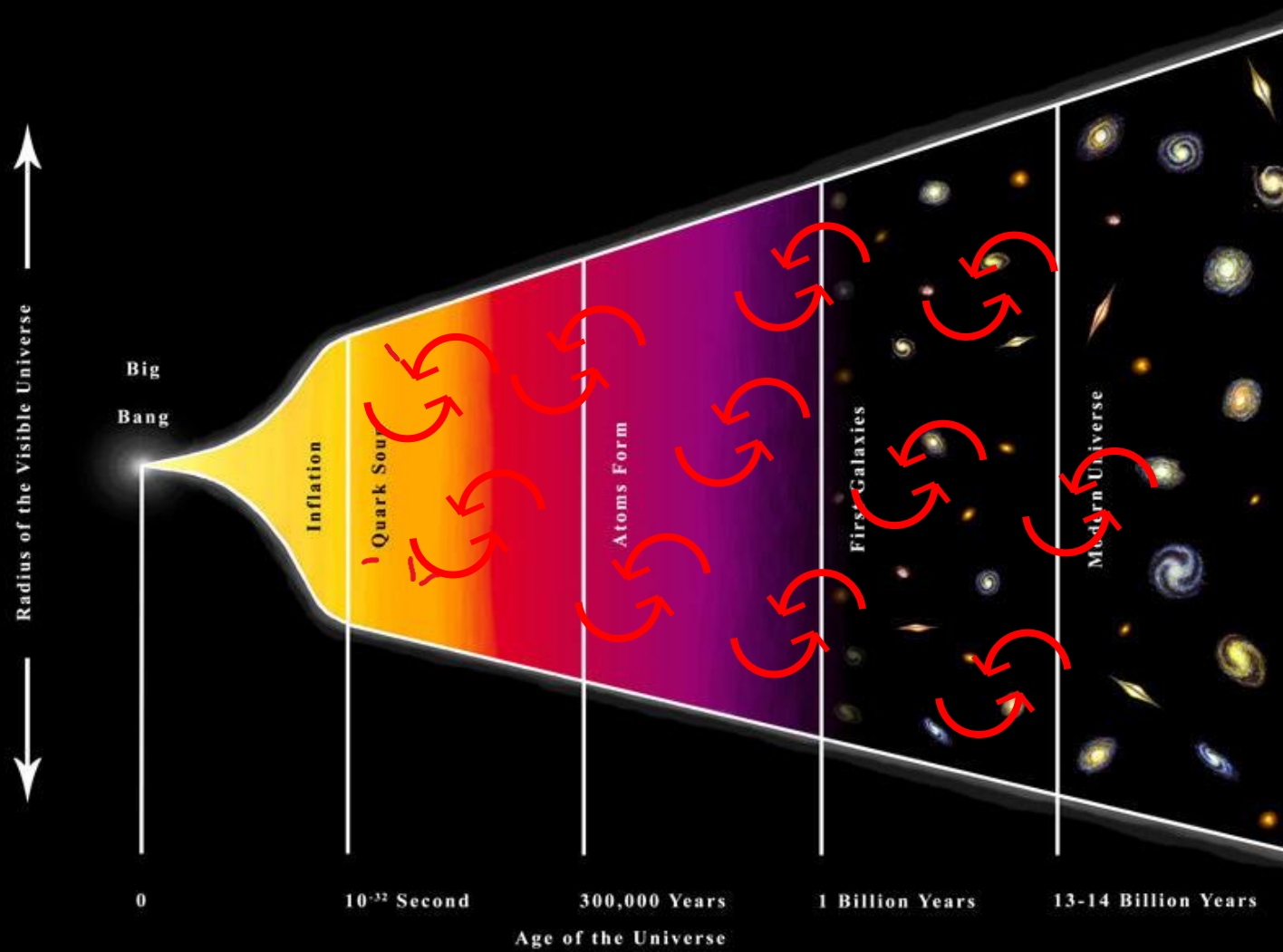
Postdoctoral scientist, SISSA

Image source: Pauline Voß for Quanta Magazine

UBIQUITOUS MAGNETIC FIELDS

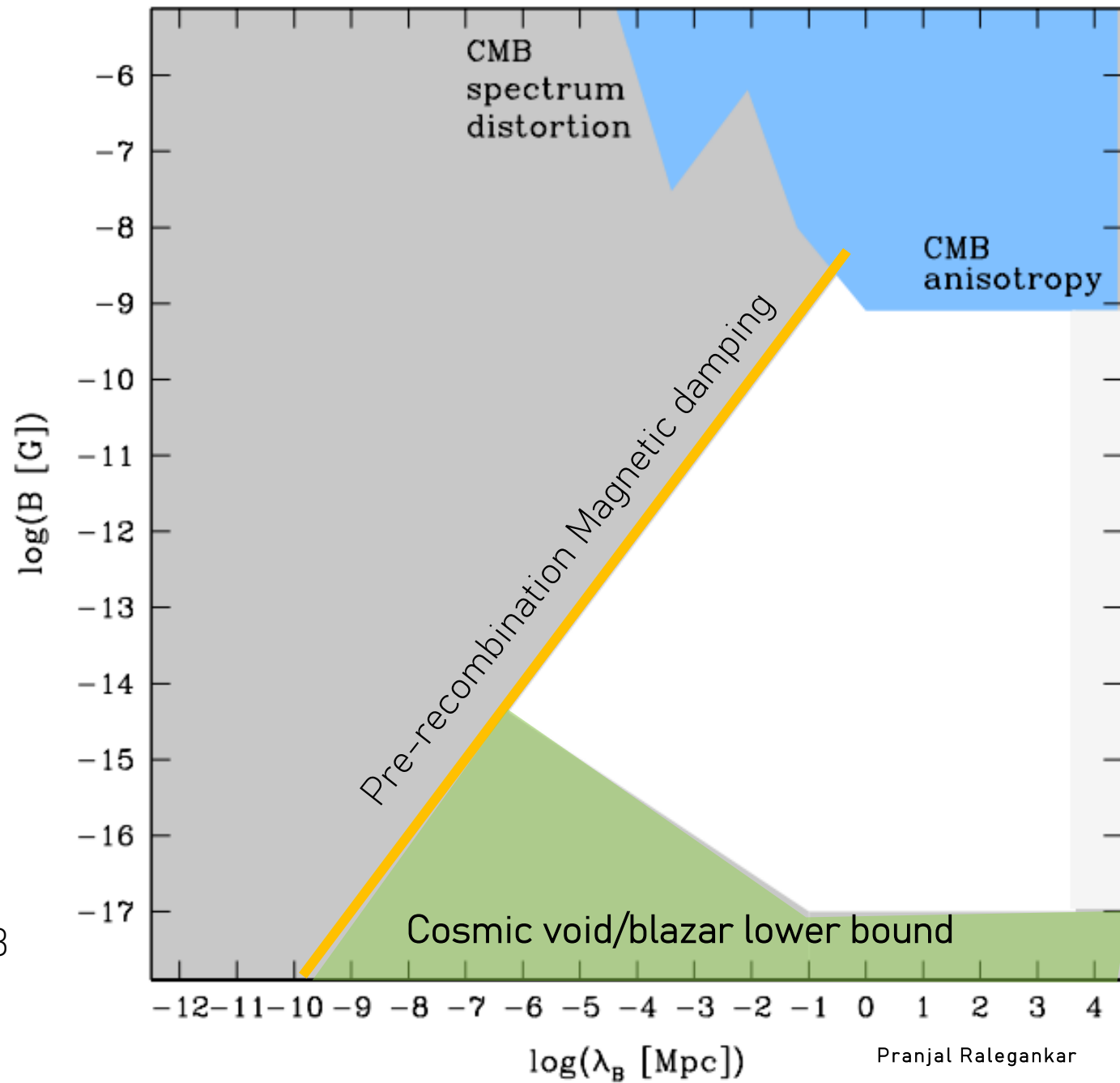


PRIMORDIAL: PRODUCED BY BIG BANG PLASMA



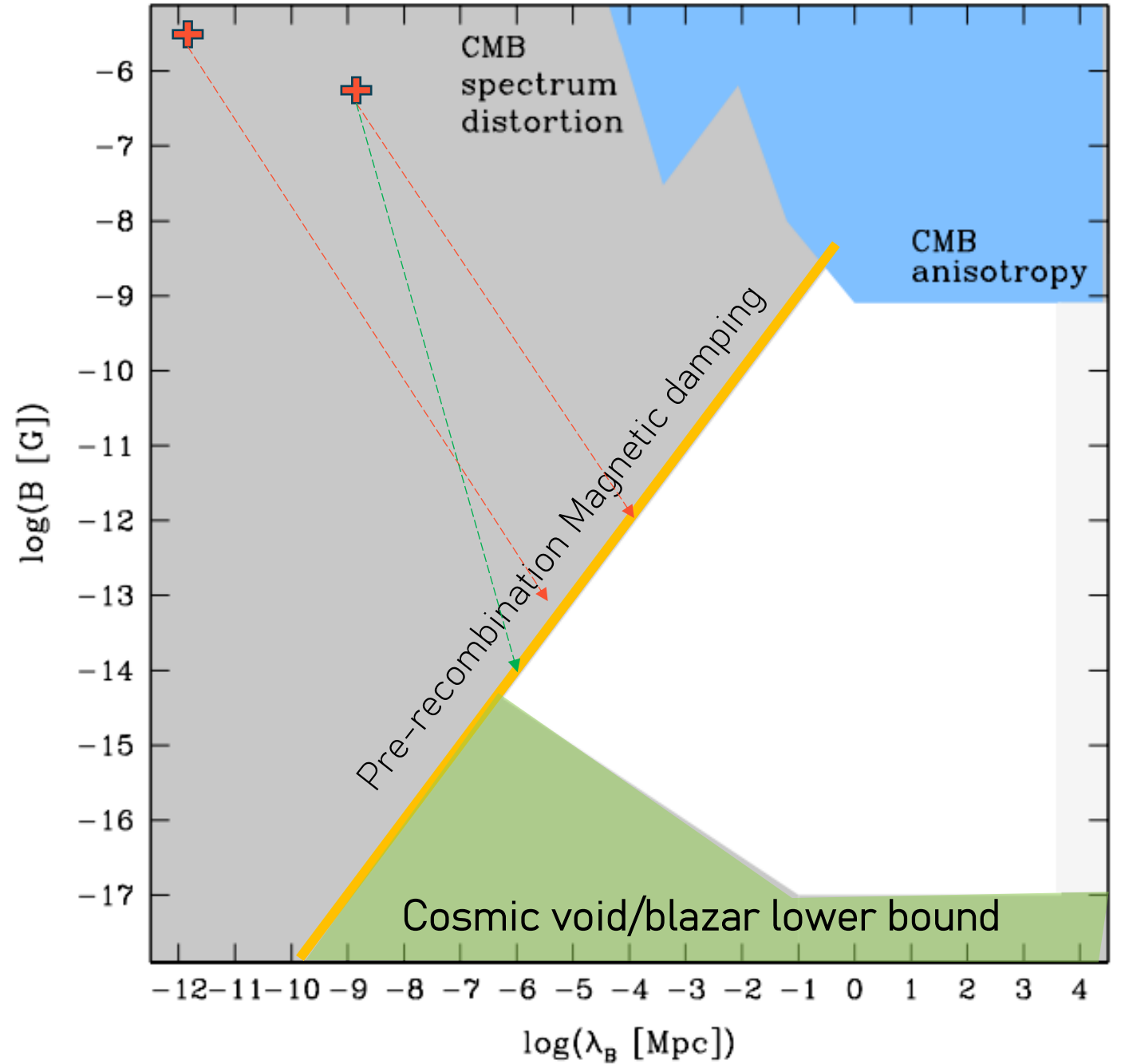
ALLOWED PMF PARAMETER SPACE

Durrer and Neronov 2013

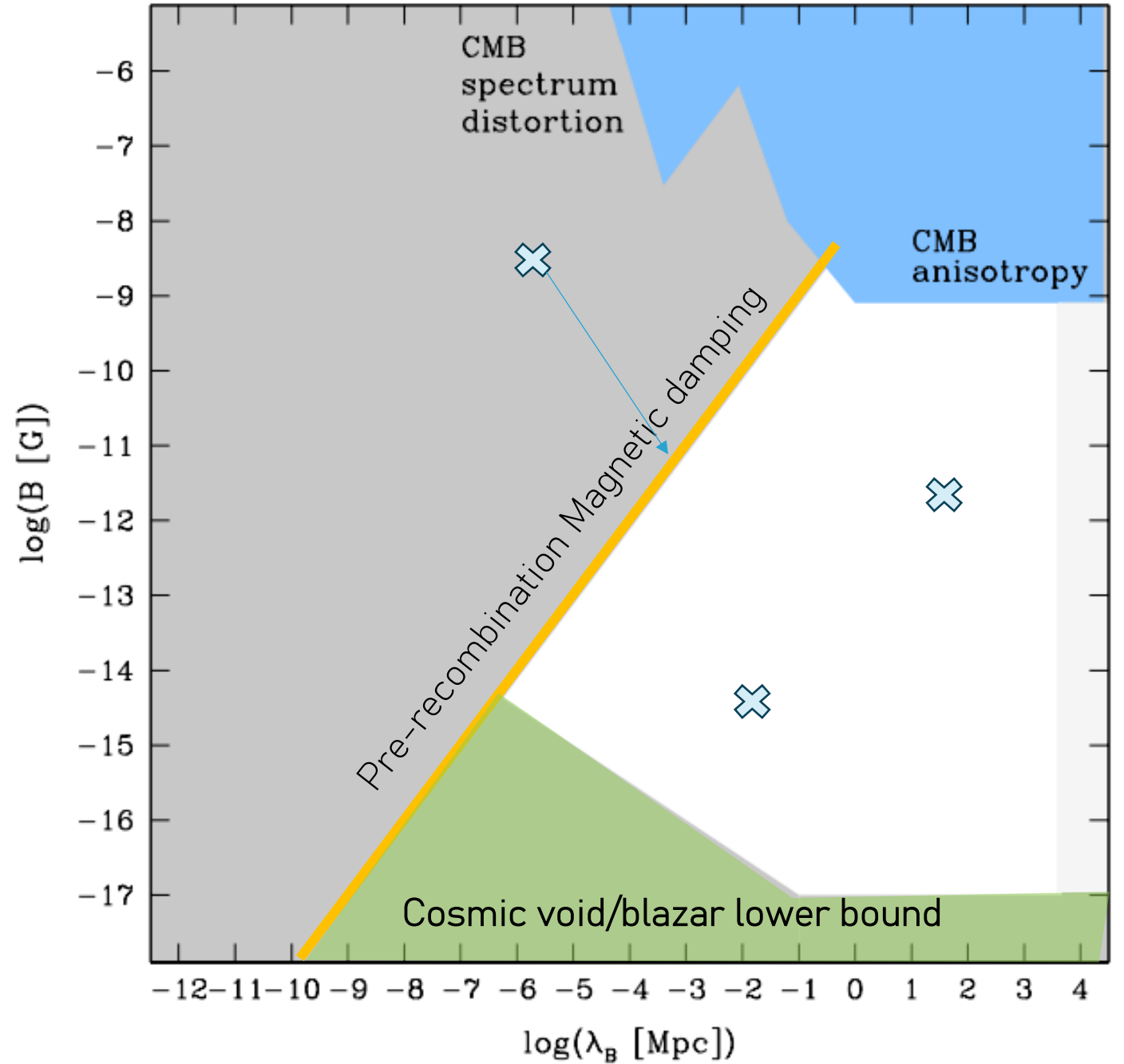


PMFS
GENERATED IN
PHASE
TRANSITIONS
LIE ON THE
DAMPING LINE

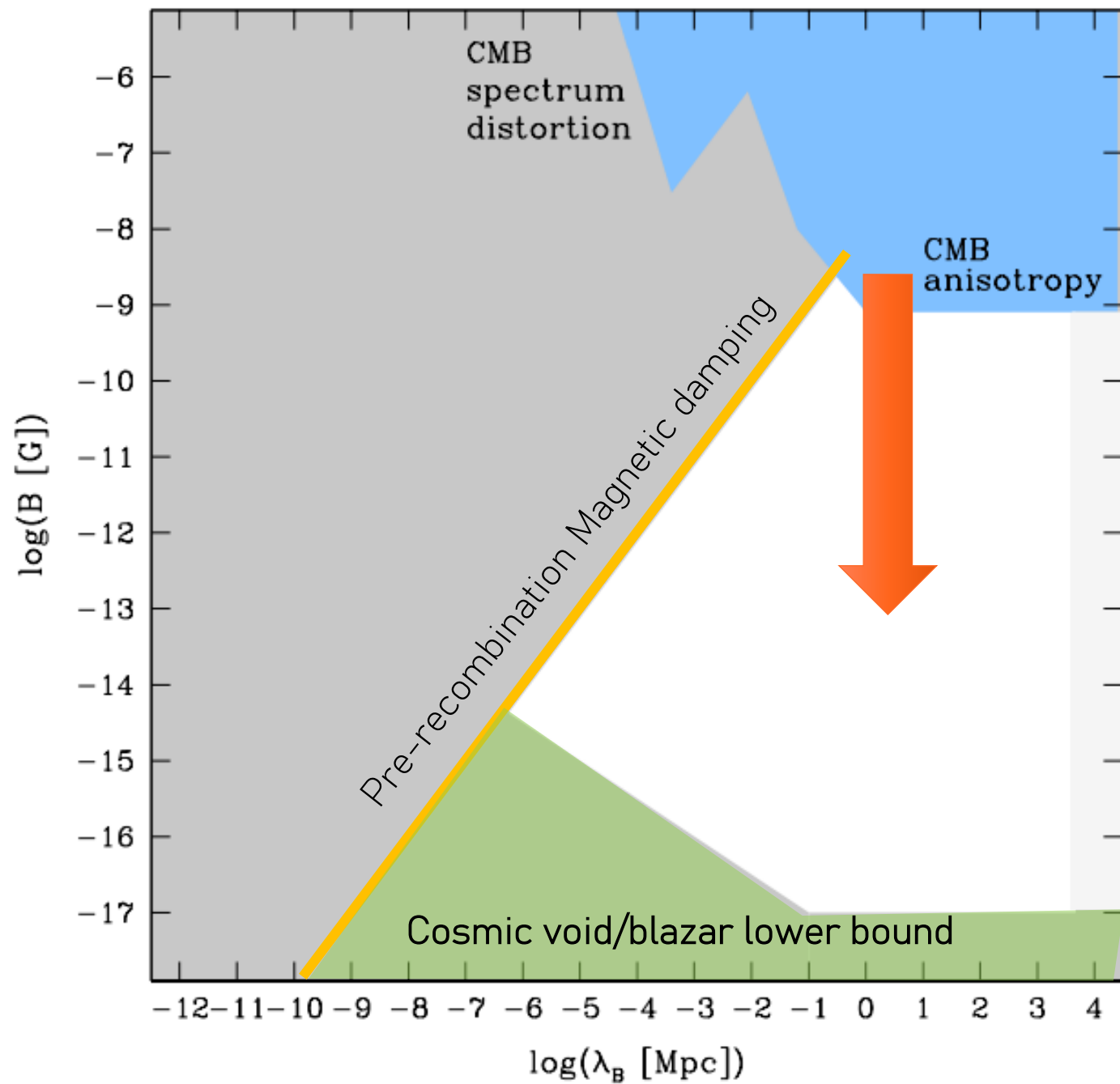
Banerjee and Jedamzik 2004



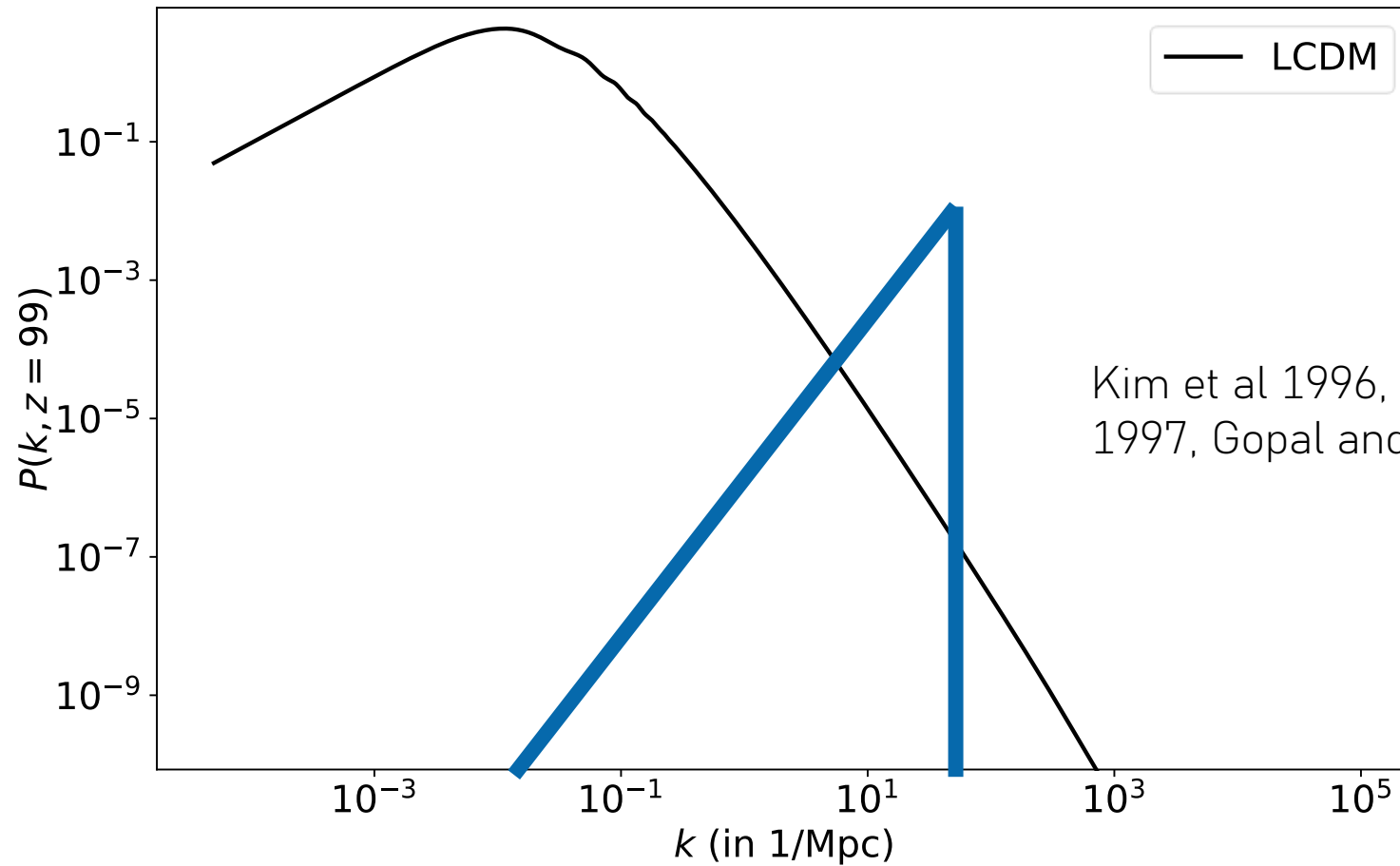
INFLATION
GENERATED
PMFS CAN BE
ANYWHERE ON
THE RIGHT OF
DAMPING LINE



GOAL: TEST THE
PRIMORDIAL
HYPOTHESIS OF
MAGNETIC
FIELDS

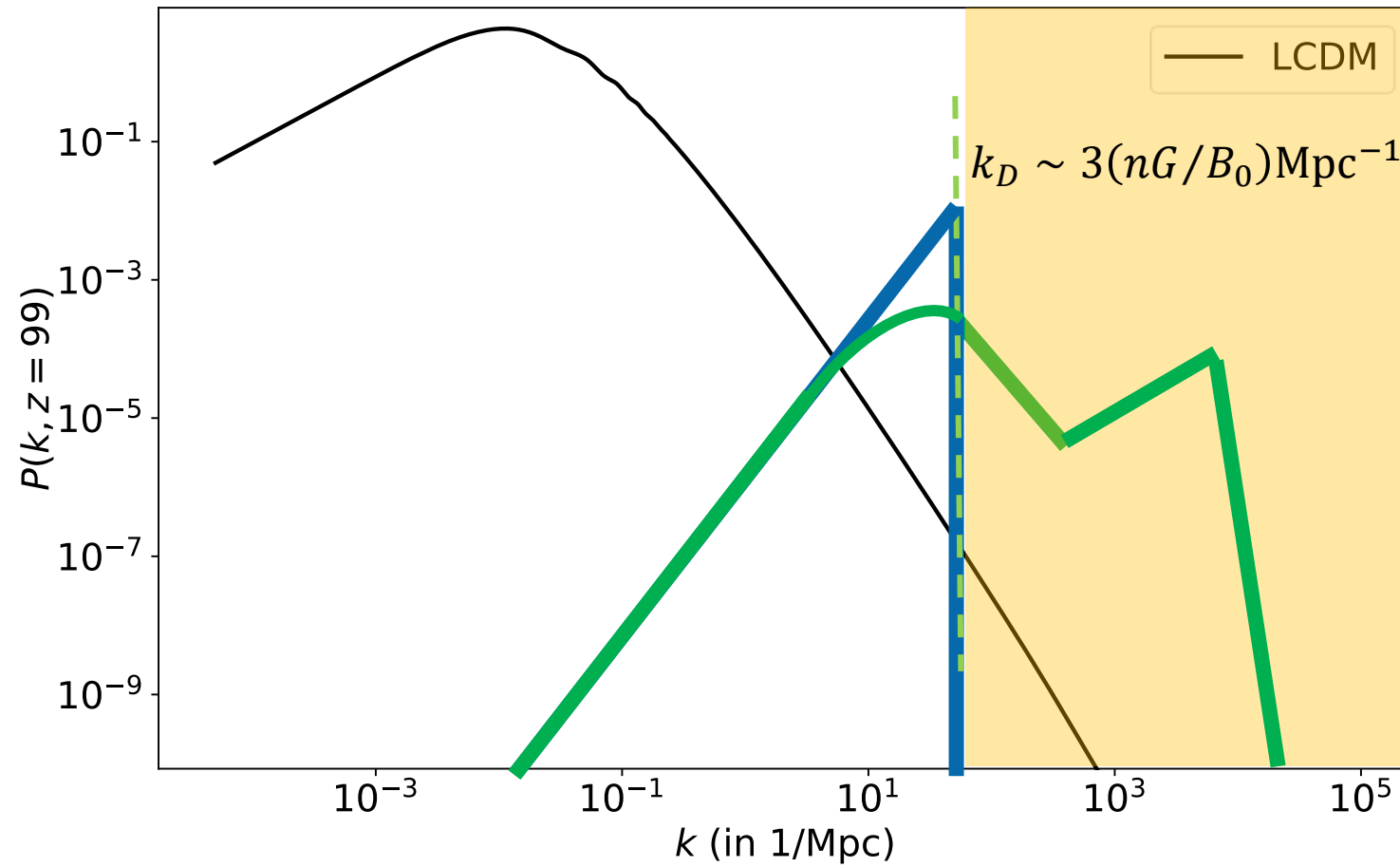


EARLY WORKS:

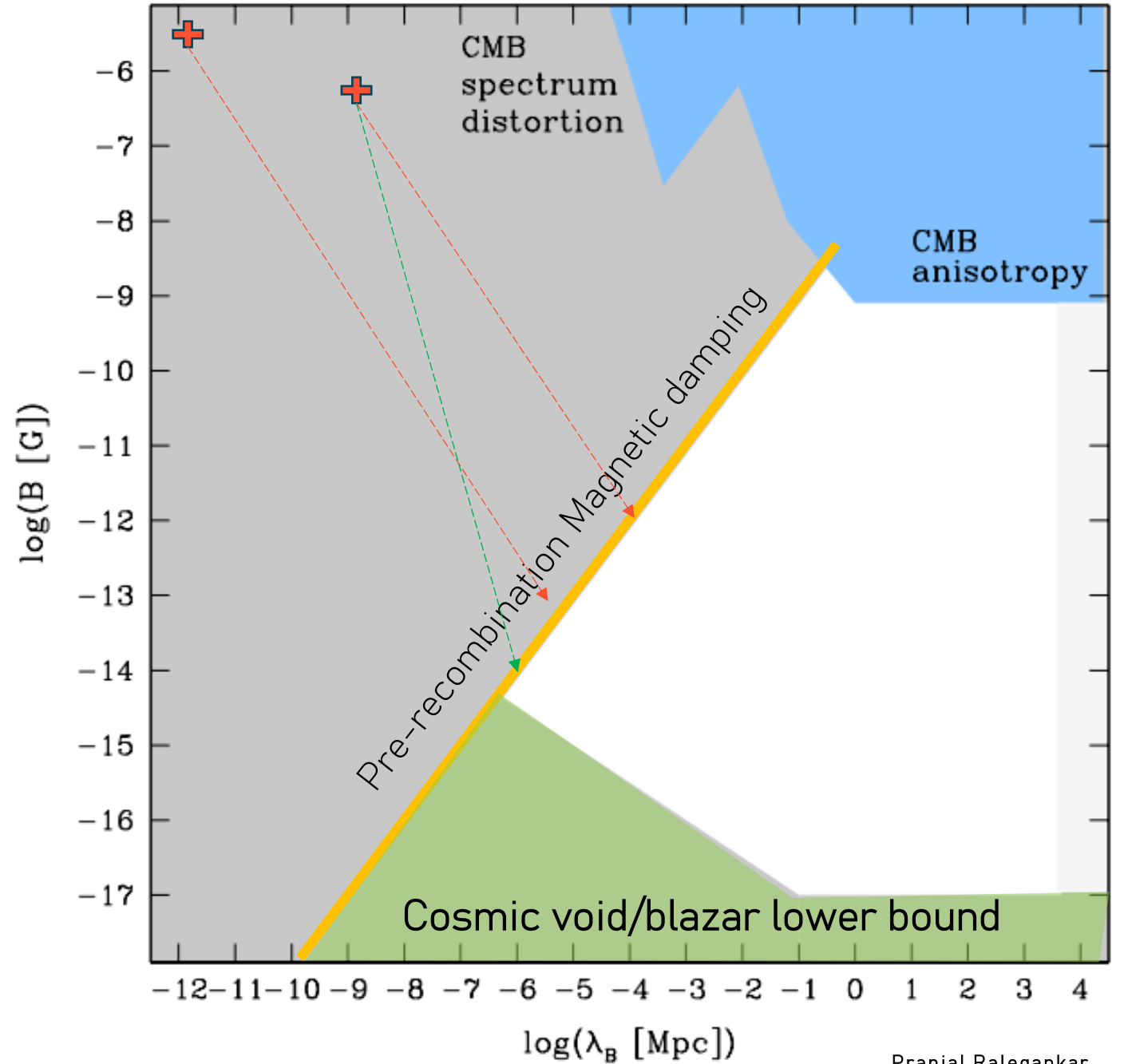


Kim et al 1996, Subramanian and Barrow
1997, Gopal and Sethi 2003

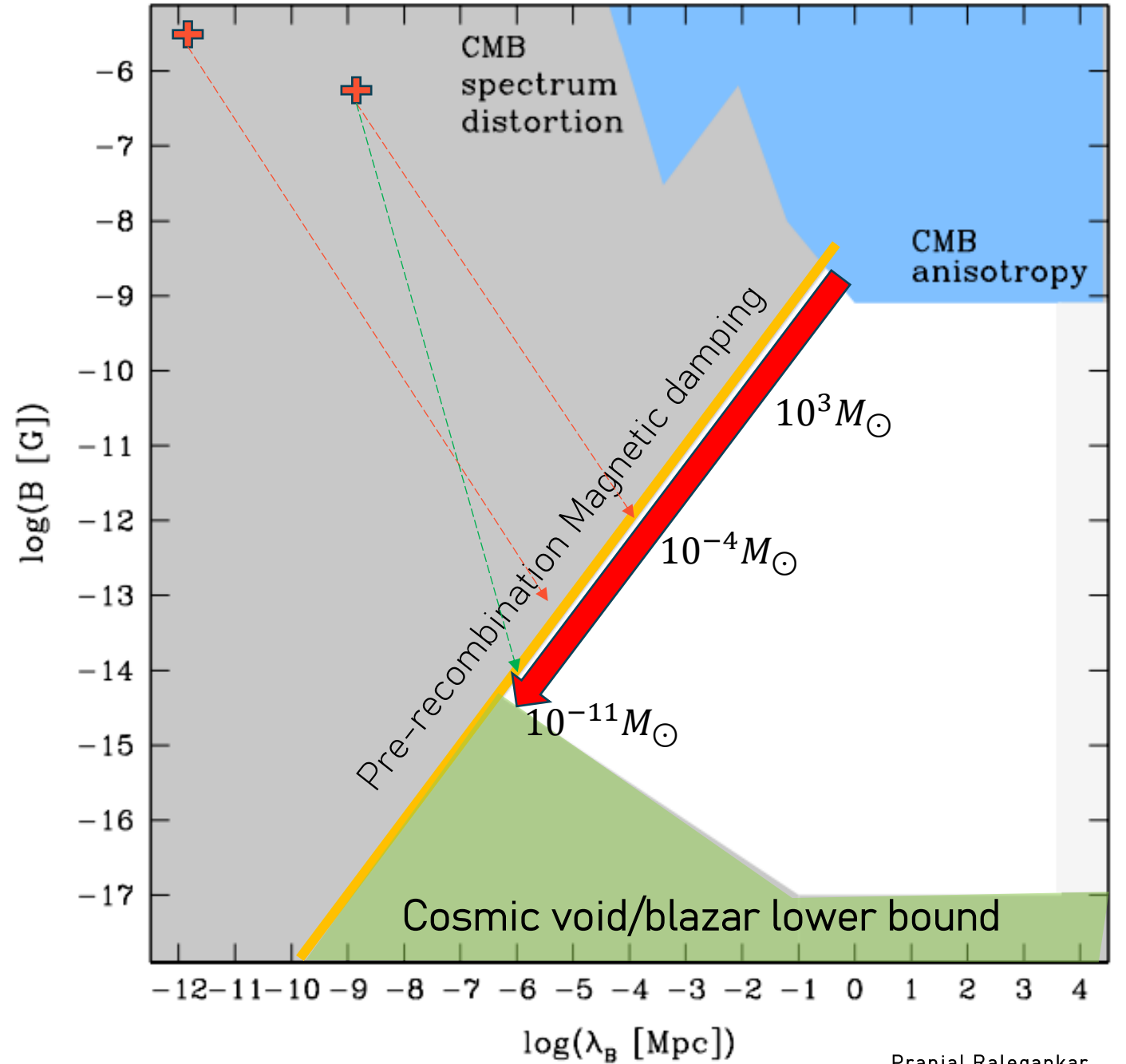
MY WORK:



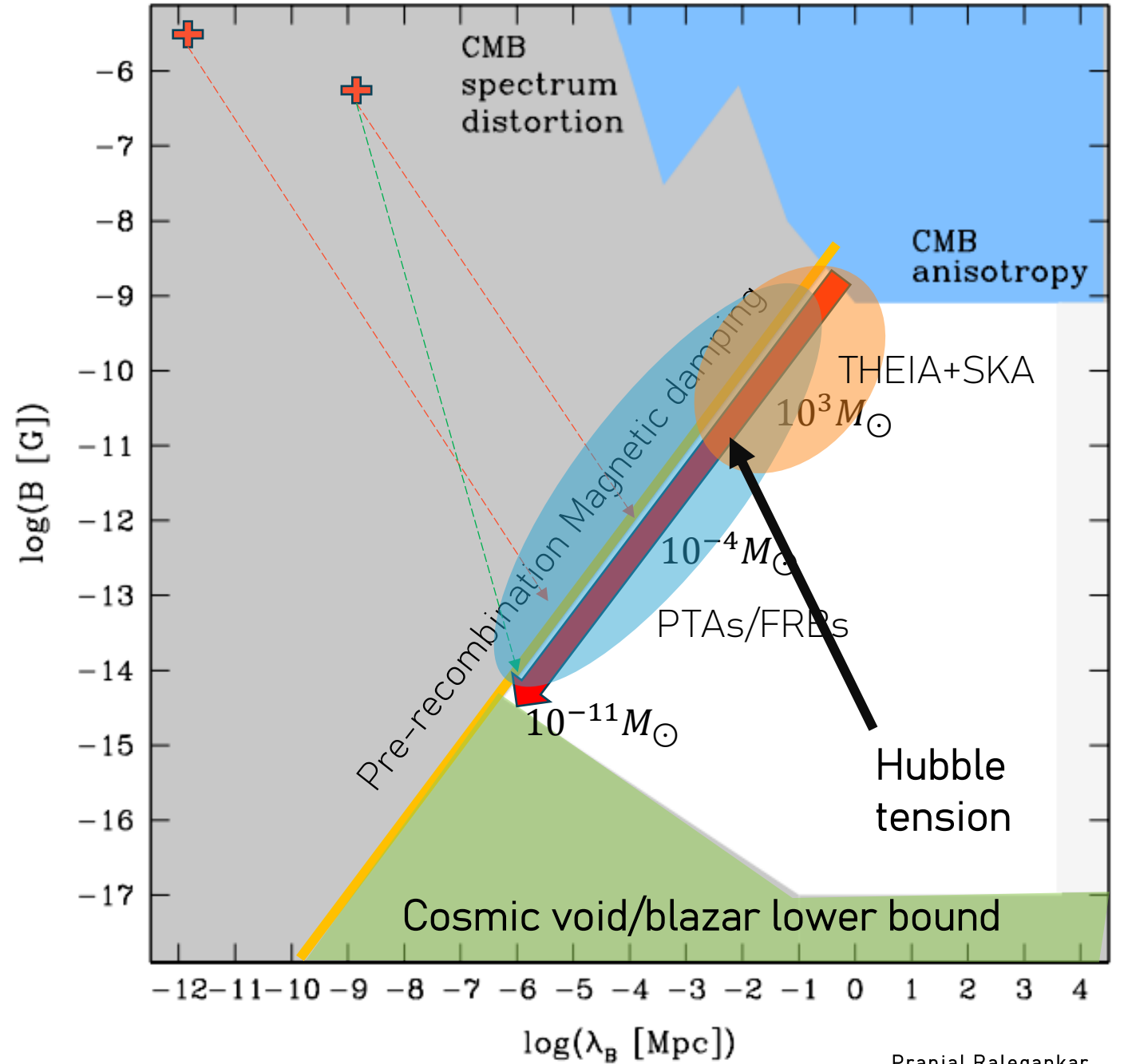
PMFS
GENERATED IN
PHASE
TRANSITIONS
LIE ON THE
DAMPING LINE



PMFS
GENERATE
DARK MATTER
MINIHALOS
FROM 10^{-11} TO
 $10^3 M_{\odot}$



POTENTIALLY DETECTABLE DARK MATTER MINIHALOS



SUMMARY AND CONCLUDING REMARKS

- Observationalists: Primordial magnetic field provides a very strong motivation to go look for dark matter minihalos
- Theorists: many phenomenology of primordial magnetic fields still unexplored
- Ironic: how invisible dark matter can help look for visible entity: magnetic fields

