

MAGNETIC FIELDS IN THE UNIVERSE

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The origin and maintenance of large scale magnetic fields in the Universe is discussed. A popular idea is that cosmic batteries generate seed magnetic fields which were amplified by magnetic induction due to turbulent motions, at times combined with differential rotation. We outline a seed field mechanism, the Biermann battery and then consider some basic ideas behind both small and large-scale turbulent dynamos. The small-scale dynamo may help understand magnetism in galaxy clusters and young galaxies, while the large-scale dynamo is important for the generation of fields with scales larger than stirring, as observed in nearby disk galaxies. Another intriguing possibility is that magnetic fields originated at some level from the early universe.
