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Relic magnetic wormholes as a possible source of toroidal magnetic fields in galaxies

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Magnetic fields observed in galaxies have the toroidal component. We present the hypothesis that such fields maybe remnants of relic magnetic torus - shaped wormholes. Such magnetic wormholes produce the two important effects. The first effect is that in the primordial plasma before the recombination magnetic fields of wormholes trap baryons whose energy is smaller than a threshold energy. They collect baryons from the nearest (horizon size) region and form clumps of baryonic matter. Such clumps may serve as seeds for the formation of ring galaxies and smaller objects having the ring form. Upon the recombination torus- like clumps may decay and merge. The second effect is that upon the recombination epoch such wormholes cease to strongly interact with baryon clumps and may expand or collapse. However, the large - scale toroidal magnetic field retains and may leave a trace in galaxies. In particular, such configurations of the magnetic field may serve as natural accelerators of charged particles and may give an essential contribution to high energy cosmic rays.

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