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Simulation of some astrophysical processes in the laboratory using plasma gun

Content :

A plasma source is developed which is very similar to washer plasma gun. It is capable of projecting plasma magnetic entities in vacuum as well as across a magnetic field at speed up to 104 m/s. The track left by this plasma magnetic entities is luminous because of the recombination light of the ions and electrons which is left behind by debris. The track is thus photographed by high speed CCD camera and the spectroscopic study of this plasma magnetic entities is carried out by high resolution spectrograph. We suggest that the processes displayed in these photographs are originally related to geometrically similar astrophysical processes, although the laboratory atom densities (about 1017 m-3) are greater by 106-107, laboratory distance (about 0.2 m)are less by 1022, laboratory time scale (about few μs) are faster by 1021, laboratory speeds are comparable, but less by 102-103. We suggest that this is representative of the basic processes involved in the formation of galaxies and perhaps an individual star.

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