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Electron Irradiation Induced Modification of Ferromagnetism in (Ga,Mn)As¹ JIA LUO, GANG XIANG, Department of Physics and Key Laboratory for Radiation Physics and Technology of Ministry of Education, Sichuan University — The ferromagnetism properties of diluted magnetic semiconductor (Ga,Mn)As firstly improved by energetic electron irradiation, through a sequence of irradiation doses. We did a systematic study of magnetization as a function of temperature and additional magnetic field. SQUID measurements demonstrate the T_c of all (Ga,Mn)As film increased from 40K to 60K after irradiation. At the same time, electron irradiation improved the crystal quality and electric properties. The irradiation process decreases the resistance by a factor of 1/2 in the range of 10K to 50K, and transforms (Ga,Mn)As samples from insulator behavior to metallic behavior. SIMS and transport measurements confirm that the rearrangement of Mn interstitials plays a key role in the improvement of ferromagnetism properties. We infer that electron irradiation paves a new path to room-temperature ferromagnetism of (Ga,Mn)As.

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Jia Luo
Department of Physics and Key Laboratory for Radiation Physics and
Technology of Ministry of Education, Sichuan University

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