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Irradiation effect on superconductivity of REBCO coated conductors

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A future accelerator facility to open up a new frontier will require a superconducting magnet with high radiation resistance. A construction plan of a second target station of materials and life science experimental facility is proposed as one of the future plans of J-PARC. At the facility, superconducting solenoids are placed just behind the target to maximize the production of secondary particles. The absorbed dose of the superconducting magnet reaches 130 MGy in 10 years and the heating radiation is roughly estimated to be 650 W. In case of conventional NbTi based coils, it is difficult to keep the coil at superconducting temperature lower than 6.5 K due to heat load by the extremely high radiation. Therefore, research and development of superconducting magnets based on REBCO coated conductors have been performed to establish technology for a next generation radiation resistant superconducting magnet. As one of the research subjects, we have been studying the irradiation effect on REBCO coated conductors. Effect of gamma ray irradiation by Cobalt-60 source on critical current of REBCO and superconductivity vanishment of REBCO irradiated above neutron fluence of $1.8 \times 10^{22} \text{ n/m}^2$ will be reported in this contribution.

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