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Possible triple superconductivity in Exchange-Spring/Superconductor hybrid system with a non-collinear magnetization[1] JIYEONG GU, JEFERY KUSNADI, California State University, Long Beach, CHUN-YEOL YOU, Inha University, Korea — We investigate the proximity effect in a superconductor/ferromagnet (S/F) hybrid system with a non-collinear magnetic configuration. A new structure of an S/exchange-spring (ES) magnet is fabricated, where an ES magnet is employed as an F layer since the magnetization configurations are varied from a collinear state to a non-collinear state by a rotating external magnetic field in a well controllable way. The superconducting property of the hybrid system was investigated as functions of the temperature, magnetic field, and the thicknesses of each layer. We found that the resistance decreases and the superconducting transition temperature increases, as non-collinearity is introduced starting from a collinear state. We explain our experimental observations mostly due to the contribution of the odd triplet superconducting condensates that survived in a non-collinear magnetization configuration in the ES magnet.

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