Spin interference effect in a triangular loop array fabricated in (001)In$_{0.53}$Ga$_{0.47}$As/In$_{0.52}$Al$_{0.48}$As quantum wells$^1$ HIROSHI OKUTANI, GSIST, Hokkaido University, TAKAAKI KOGA, GSIST, Hokkaido University & CREST, JST, YOSHIKAZU SEKINE, NTT BRL, NTT Corporation — We report, for the first time, the spin interference (SI) effect in a triangular loop array fabricated in (001) In$_{0.53}$Ga$_{0.47}$As/In$_{0.52}$Al$_{0.48}$As quantum wells (QW). Previously [1], we studied the SI effect in a square loop array, where the sides of the squares are either parallel or perpendicular to the $<110>$ crystallographic axis. For an electron with a wave vector $k$ that is parallel or perpendicular to the $<110>$ direction, the magnitude of the effective magnetic field due to the all spin-orbit effects, $B_{TOT}$, is given either by the sum ($B_R + B_D$) or by the difference ($B_R - B_D$) between the Rashba and Dresselhaus fields, which makes the analysis relatively simple. Though the situation is more complicated in a triangular loop array, theory including both the Rashba and Dresselhaus terms predicts clear difference in the SI patterns between the following two situations: the bases of the triangles in the array are placed parallel/perpendicular to the $<110>$ crystallographic axis. This finding is being confirmed experimentally. [1] T. Koga et al., Phys. Rev. B 70, 161302(R) (2004); ibid. 74, 041302(R) (2006).

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