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Optical non-reciprocity and slow light propagation in coupled spinning optomechanical resonators IMRAN MIRZA, Macklin Quantum Information Sciences, Dept. of Physics, Miami Univ., WENCHAO GE, Institute for Quantum Science and Engineering, Dept. of Physics and Astronomy, Texas A&M Univ., HUI JING, Dept. of Physics and Synergetic Innovation Center for Quantum Effects and Applications, Hunan Normal Univ., MIRZA'S RESEARCH GROUP TEAM, IQSE, TEXAS AM UNIVERSITY, USA COLLABORATION, DEPT. OF PHYSICS AND SYNERGETIC INNOVATION CENTER FOR QUANTUM EFFECTS AND APPLICATIONS, CHINA COLLABORATION — Recently [Nature 558, 7711, 569 (2018)] architectures based on fiber coupled spinning micro-ring optomechanical resonators have shown ability to perform non-reciprocal light propagation without using traditional means such as magneto-optical based Faraday rotation. Motivated by these studies, we investigate the optical transmission of pump-probe driven spinning optomechanical micro-ring resonators coupled in a series configuration [arXiv:1810.03709]. The main focus of our work is to analyze how changing optical Sagnac effect due to same or opposite spinning directions of resonators can provide means to non-reciprocal and delayed transmission of the probe light. We expect the results to be relevant to the problem of photon transport in quantum networks and quantum communications.

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