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Scattering to different vortex polarity in coupled long Josephson junctions WALTRAUT WUSTMANN, KEVIN D. OSBORN, Laboratory for Physical Sciences, College Park, MD — We theoretically study the motion of flux vortices (fluxons) in structures made from discrete long Josephson junctions (DLJJs) which may have applications in the fields of reversible and low-power computing. We investigate the scattering of fluxons at specially designed interfaces where multiple DLJJs meet. Once fluxons approach the interface, flux oscillations at the interface can be temporarily excited before the fluxons continue along to another DLJJ. Under some conditions the fluxons will change their polarity (to antifluxons) and in other cases the fluxon continues without a change in polarity. We explain the dynamics through the resonant interaction of the soliton with bound states at the interface. We also study a controlled polarity gate, where the polarity of the target fluxon depends on a control fluxon which enters and exits the interface through separate DLJJs.

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