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Transmission and circular currents in a bi-output double-ring structure[1] ROBIN KLAUSE, ERIC HEDIN, Ball State University — The electron transmission through a bi-output, double-ring nanoscale structure is studied as a function of external magnetic flux and system-leads couplings. Circular transmission currents in the rings are also calculated and shown to exhibit a strong dependence upon flux and electron energy. The symmetry of the ring system with respect to the source and drain couplings is varied through converting the double-ring system to single-ring system by breaking the inter-site bond shared between the two rings. A tight-binding model of the Schrodinger equation is used to analyze the electron transmission properties of the nano-scale ring structure (with six embedded quantum dots per ring). This system can also provide a model for a molecular naphthalene structure, connected in a bi-output configuration. We present calculations showing the quantum-mechanical circular transmission resonances and the system I/V characteristics as a function of external flux and system coupling parameters.

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