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Fano-Like Resonances in Self-Coupled Waveguide Sagnac Interferometers

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We present Fano-like resonances in silicon-on-insulator (SOI) nanowire resonators composed of coupled Sagnac interferometers (SIs). By tuning the reflectivity of each SI and the inter-coupling strength, we precisely control coherent mode interference to realize high-performance optical analogues of Fano resonances. The device, designed and fabricated on an SOI platform, is analyzed theoretically and validated experimentally. Simulations predict periodic resonances with high extinction ratios and steep slopes, arising from strong coherent mode interference in a compact configuration. Experimental results closely match theoretical predictions, confirming the design's effectiveness and underscoring the potential of coupled SIs for compact, high-performance Fano-like resonance generation in integrated photonics.

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