LA-UR-22-21615

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Title: 2021 IC Project Report Viewgraph

Author(s): Nguyen, Khanh Linh

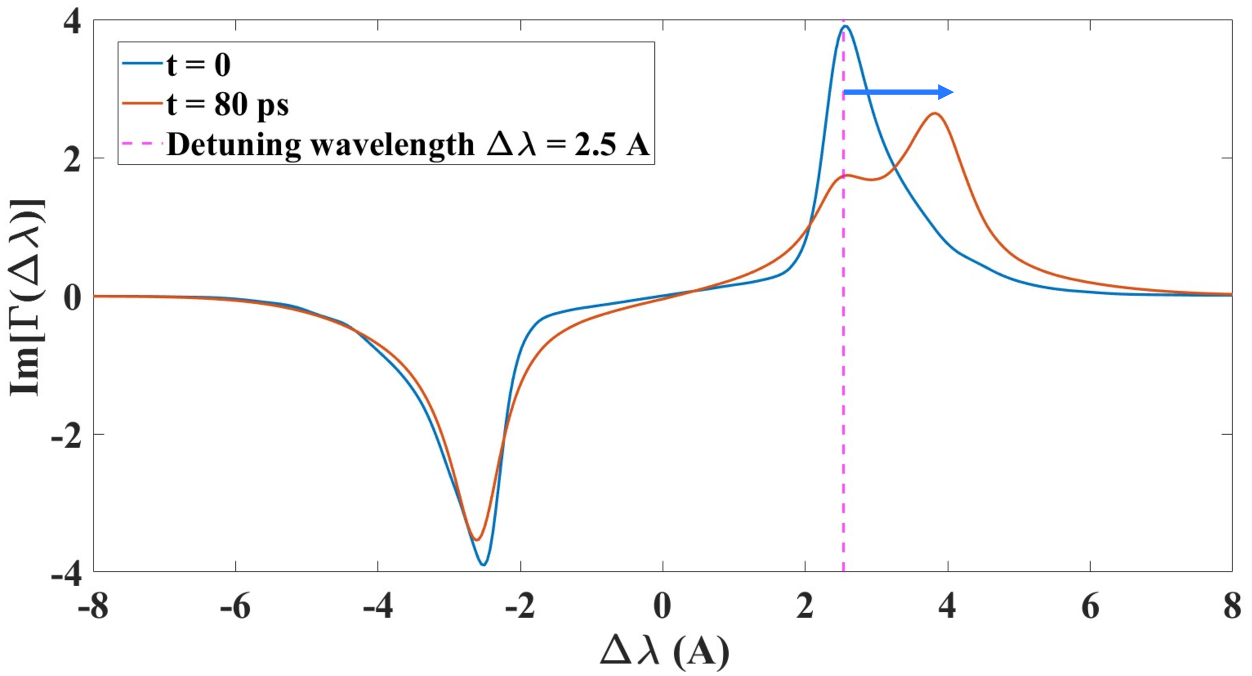
Intended for: Report

Issued: 2022-02-24

2021 IC Project Report Viewgraph

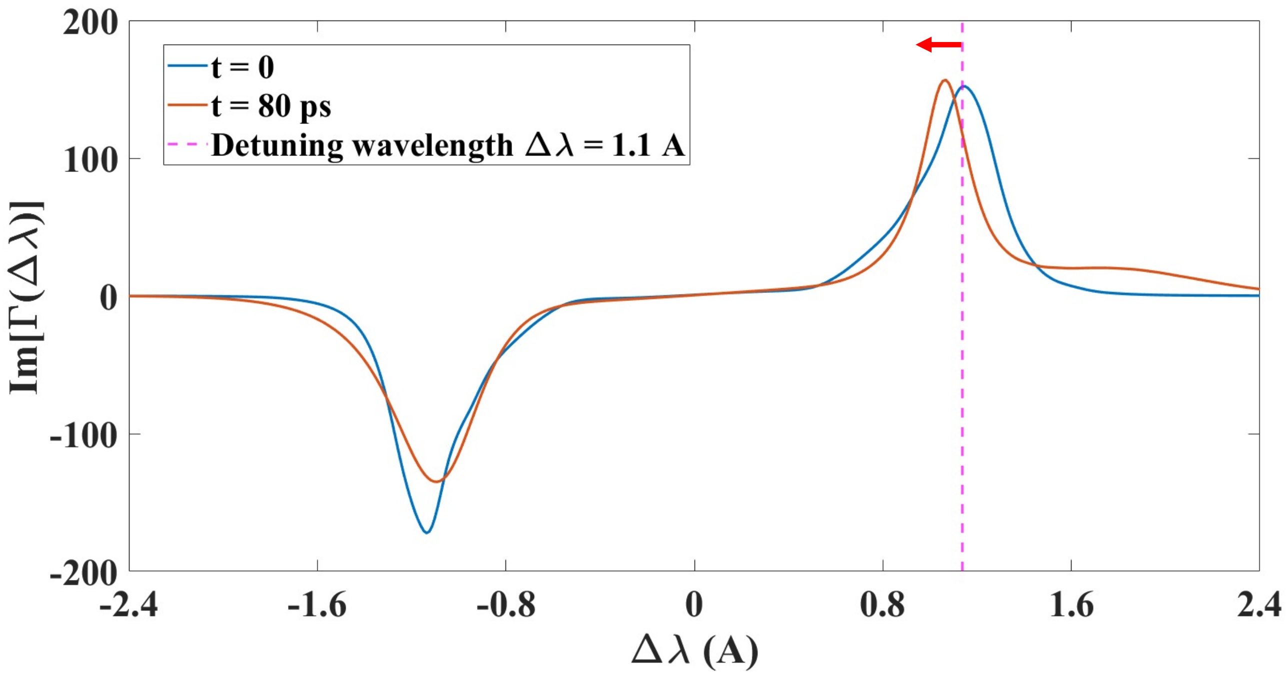
Here we show that cross-beam energy transfer (CBET) saturates through a resonance detuning that depends on the IAW phase velocity and that results from trapping-induced modifications to the ion distribution functions. For smaller phase velocities, the modifications to the distribution functions can rapidly thermalize in the presence of mid-Z ions, leading to a blueshift in the resonant frequency. For larger velocities, the modifications can persist, leading to a redshift in the resonant frequency.

For the small phase velocity, the resonant IAW frequency is blueshifted due to the quick thermalization process



- The coupling factor Im[Γ], which determines CBET gain in the steady state approximation, is plotted. Initially, the IAW is driven on resonance (represented by the intersection of the black dashed lines and the peak of the blue curve). Later, the increase in ion temperatures blueshifts the resonance peakc

For the large IAW phase velocity, ion trapping leads to a redshift in the resonant IAW mode



- The coupling factor Im[Γ], which determines CBET gain in the steady state approximation, is plotted. Initially, the IAW is driven on resonance (represented by the intersection of the black dashed lines and the peak of the blue curve). Later, persistent tails of the distribution function due to trapping redshift the resonance peak