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Investigation of DUV generation for a Si quantum computer[1]
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— Laser cooling and trapping of atoms in a magneto-optic trap (MOT) may be used as a source for depositing single silicon atoms with nanometer precision, which is required for making a scalable silicon quantum computer. A Si MOT requires a tunable, continuous wave laser at the cooling transition wavelength of 221.7 nm. Tens of mW are needed. Our scheme is to frequency double a Ti:Sapphire laser at 886.8 nm to 443.4 nm, then again to 221.7 nm. Resonant cavities are used to enhance the laser power. Mode matching into the cavity, phase matching in the crystal, and minimization of losses also improve efficiency. Theoretical predictions of optimal cavity parameters have been calculated. Values for crystal absorbance, walk-off, and waist size were used to predict second harmonic output power. Experimental results for the second harmonic generation will be presented.

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