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Fabrication of Linear Nanostructures Via Laser Interference Lithography AMANDA MATHESON, Colorado School of Mines, DR. JERAMY ZIMMERMAN COLLABORATION, DR. EMILY WARREN COLLABORATION, DR. ADELE TAMBOLI COLLABORATION, DR. JEFF SQUIER COLLABORATION — III-V compounds are desirable semiconductor materials for tandem photovoltaic cells, with many alloys having a direct band gap and appropriate band gap values; however, III-V substrates are much more expensive than silicon to produce, which makes them undesirable for commercial terrestrial solar applications. III-Vs can be grown epitaxially on a v-grooved silicon substrate with (111) planes exposed, which prevents the development of anti-phase domains (APDs). APDs can result in reduced device efficiency and must be avoided. We use laser interference lithography (LIL) capable of patterning linear nanostructures with pitches below 300 nm. LIL is faster and less expensive than conventional methods of patterning at these length scales (such as electron-beam lithography), and can be performed on rough surfaces. We have successfully patterned linear nanostructures with different pitches across a silicon substrate area of 1 cm x 1cm. Future work includes developing LIL and v-groove etch process parameters on silicon typical of that used in commercial photovoltaics.

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