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Metal-mediated assembly of Ge island arrays on Si JEREMY ROBINSON, University of California-Berkeley, CA 94720; Lawrence Berkeley National Lab, Berkeley, CA 94720, J. ALEXANDER LIDDLE, ANDREW MINOR, VELIMIR RADMILOVIC, Lawrence Berkeley National Lab, Berkeley, CA 94740, DON WALKO, DOHN ARMS, Argonne National Lab, Argonne, IL 60439, OSCAR DUBON, University of California-Berkeley, CA 94720; Lawrence Berkeley National Lab, Berkeley, CA 94720 — A new approach for the directed assembly of Ge islands via molecular beam epitaxy at 873 K on Au-patterned Si surfaces has been realized. For a square Au-patterned array, a square lattice of sub 100nm Ge islands extending over thousands of square microns can be formed. Ge islands grow at the (1/2,1/2) positions of the original Au-pattern and have distinct shapes strongly influenced by substrate orientation; square-based truncated pyramidal islands grow on Si(100) while long rod-shaped islands grow on Si(110). These islands are strikingly different from huts and domes that grow on unpatterned Si. Island density, size, and degree of ordering are all controlled by the characteristics of the patterned Au. Transmission electron microscopy and x-ray diffraction show that islands relax by both the introduction of dislocations and intermixing with Si. The approach presented here is an effective and versatile method to manipulate surface kinetics and thereby control island-array assembly processes. Supported by US Department of Energy

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