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Tuning charge density wave transition by introducing periodic strain patterns in thin 1T-TaS_2 layers[1] XINYUAN LAI, JINHAI MAO, JUNXI DUAN, EVA ANDREI, Rutgers Univ, EVA ANDREI TEAM — Charge density waves (CDW) can significantly influence the electronic properties of materials. These correlated states form below a critical temperature which is controlled by the strength of the interactions between the conduction electrons and the crystal lattice. The CDW transition temperature is highly sensitive to lattice perturbations and distortions such as can be induced by strain or by reducing the sample thickness. We report on the effects of strain in addition to sample thickness on the CDW transition in thin 1T-TaS_2 films. Periodically modulated strain fields are induced in the thin film samples by depositing them on an array of micron size Au pillars. The pillar structures are supported on a 300nm, SiO_2 layer capping a highly doped Si backgate. We employ transport measurements to investigate the effect of the pillar-induced strain, sample thickness and array parameters on the transition temperature between commensurate and incommensurate CDWs.

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