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Raman spectroscopy of sputtered metal-graphene and metal-oxide-graphene interfaces CHING-TZU CHEN, MARCIN GAJEK, MARCUS FREITAG, MARCELO KURODA, VASILI PEREBEINOS, SIMONE RAOUX, IBM TJ Watson Research Center — In this talk, we report our recent development in sputtering deposition of magnetic and non-magnetic metal and metal-oxide thin films on graphene for applications in spintronics and nanoeleoctronics. TEM and SEM images demonstrate homogeneous coverage, uniform thickness, and good crystallinity of the sputtered films. Raman spectroscopy shows that the structure of the underlying graphene is well preserved, and the spectral weight of the defect D mode is comparable to that of the e-beam evaporated samples. Most significantly, we report the first observation of graphene-enhanced surface excitations of crystalline materials. Specifically, we discover two pronounced dispersive Raman modes at the interface of graphene and the nickel-oxide and cobalt-oxide films which we attribute to the strong light absorption and high-order resonant scattering process in the graphene layer. We will present the frequency-dependent, polarization-dependent Raman data of these two modes and discuss their microscopic origin.

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