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**Reconstruction of tip-surface interactions with multimodal intermodulation atomic force microscopy**[1] STANISLAV BORYSOV, Nordita, KTH Royal Institute of Technology and Stockholm University, Roslagstullsbacken 23, SE-106 91 Stockholm, Sweden, DANIEL PLATZ, Nanostructure Physics, KTH Royal Institute of Technology, Roslagstullsbacken 21, SE-106 91 Stockholm, Sweden, ASTRID DE WIJN, Department of Physics, Stockholm University, SE-106 91 Stockholm, Sweden, DANIEL FORCHHEIMER, Nanostructure Physics, KTH Royal Institute of Technology, Roslagstullsbacken 21, SE-106 91 Stockholm, Sweden, ERIC TOLÉN, Intermodulation Products AB, Vasavägen 29, Solna SE-169 58, Sweden, ALEXANDER BALATSKY, Nordita, KTH Royal Institute of Technology and Stockholm University, Roslagstullsbacken 23, SE-106 91 Stockholm, Sweden, DAVID HAVILAND, Nanostructure Physics, KTH Royal Institute of Technology, Roslagstullsbacken 21, SE-106 91 Stockholm, Sweden — We present a developed theoretical framework for reconstructing tip-surface interactions using the intermodulation technique when more than one eigenmode is required to describe the cantilever motion. Two particular cases of bimodal motion are studied numerically: one bending and one torsional mode, and two bending modes. We demonstrate the possibility of accurate reconstruction of a two-dimensional conservative force field for the former case, while dissipative forces are studied for the latter.

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