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On the hydrodynamics of dot spectroscopy experiments at the National Ignition Facility OLIVIER POUJADE, CEA DAM DIF — The dot spectroscopy [M. A. Barrios et al., PoP 23, 056307 (2016)] platform was developed in the context of indirect-drive Inertial Confinement Fusion at the NIF in order to assess the electron temperature of the plasma within the hohlraum. The possibility of a mixing between the tracer-dot and the ablator is advocated on theoretical ground and with help from dedicated numerical simulations of shots N141216 (0.8× scaled hohlraum, gas filled with neopentane at 1.37 mg/cm^3) and N150427 (full scale hohlraum, gas filled with helium at 0.96 mg/cm^3). So far, all simulations (LLNL and CEA) of this platform were integrated and the possibility of a mixing was inhibited by the lack of resolution. Refined simulations of the region around the tracer-dot and the ablator, subjected to the correct irradiation versus time, show that mixing might occur very early in the course of the drive and would be caused by classical Rayleigh-Taylor instability at the interface between the tracer-dot and the ablator. This effect seems to contribute significantly to the glaring discrepancy between integrated simulations and experiments with respect to the dot location (off by 200 μm) and with respect to the electron temperature (off by 500 eV).

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