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Study of the momentum coupling between liquid fuel and the chamber gas during injection with a novel dense spray LES approach.

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We study the momentum coupling between a liquid phase injected at high speed and a quiescent gas using a novel dense spray parallel code architecture. This architecture can handle strong loadings of liquid in an efficient, accurate and robust way. Even though important features of atomization such as surface tension are left aside, the knowledge of the way the jet entrains the gas, creates turbulence and is dispersed by it is an essential element to predict the fuel evaporation and mixing topology. This work aims at assessing the capabilities of a massively parallel LES solver in performing industrial simulations of sub-critical injection and combustion, which is an important tool for the design of advanced engines.