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The overlapping particle technique for multi-resolution simulation of particle methods

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Highlights:

- The overlapping particle technique (OPT), which is a multi-resolution technique for particle methods, is explained in detail.
- Techniques for reducing error of total fluid mass were added to the OPT.
- The OPT was applied to the moving particle semi-implicit (MPS) method, the explicit MPS method, and smoothed particle hydrodynamics.
- The OPT was verified and validated. The results show that the OPT allows us to reduce the required number of particles and the computational time of particle simulations at a small mass error while retaining the robustness of particle simulations.

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