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Abstract title	**Recent advances in numerical modeling of plasma based acceleration**
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Abstract (approx. 50 words maximum)

The new techniques developed to simulate plasma based accelerators are described, including the boosted frame scheme, new hardwares, and advanced schemes. Examples of applications to state-of-the-art experiments are presented, together with results for the next generation of laser wakefield accelerators in the petawatt range.

Summary (approx. 350 words maximum, including references)

Important advances in the numerical modeling of plasma based acceleration have been achieved over the last few years. New techniques have been developed to increase the calculation speed, to include additional physical phenomena that improve the comparison with experimental data, and to allow for more sophisticated diagnostics. This talk will briefly describe these developments, including the boosted frame scheme, that allows for computational savings of several orders of magniture, the usage of graphic cards to perform faster calculations, and the overall code optimization for scaling to supercomputers with 300000 cores. The application of these techniques to the modeling of state-of-the-art experiments is then described, covering both standard self-guiding configurations, and controlled injection scenarios with lasers and particle beams. Finally, we use the boosted frame technique to model the next generation of laser wakefield accelerator experiments in the petawatt range.