Universitatea de Vest
din Timişoara

Postul: Asistent cercetare

Poziția: 12

ICAM: Departamentul de Cercetare Științifică în Fizică

TEMATICA PENTRU PROBA TEORETICĂ

1. Interactia laser-plasma si productia plasmei.

2. Accelerarea de particule in campuri laser intense.

3. Absorptia luminii laser in plasma.

4. Propagarea luminii laser in plasma.

5. Mecanismul T.N.S.A. (Target Normal Sheath Acceleration) pentru accelerarea de particule in camp laser.

6. Mecanismul R.P.A. (Radiation Pressure Acceleration) pentru accelerarea de particule in camp laser.

7. Metoda P.I.C. (Particle In Cell) pentru simularea interactiei laser-plasma.

8. Aplicatii practice ale accelerarii de particule prin intermediul interactiei laser-plasma.

TEMATICA PENTRU PROBA PRACTICĂ

1. Pregatirea unei simulari de tip Particle In Cell in codul SMILEI pentru interactia laser plasma pentru diferite dimensiuni ale tintei.

2. Pregatirea unei simulari de tip Particle In Cell in codul SMILEI pentru interactia laser plasma pentru diferite intensitati ale laserului.

3. Studiul interactiunii laser-plasma in regim ultrarelativist.

4. Interpretarea si vizualizarea datelor obtinute in urma unei simulari de tipul Particle In Cell.

BIBLIOGRAFIA PENTRU PROBA TEORETICĂ ȘI PROBA PRACTICĂ

1. Sharipov F. (2016), *Rarefied gas dynamics*, Wiley-VCH Verlag GmbH & Co., Weinheim, Germany.

2. Rieutord M. (2015), *Fluid dynamics – An introduction*, Springer International Switzerland.

3. Ambruș V. E., Sofonea V. (2012), *High-order thermal lattice Boltzmann models derived by means of Gauss quadrature in the spherical coordinate system*, Phys. Rev. E 86 016708.

4. Kundu P. K., Cohen I. M., Dowling D. R. (2016), *Fluid Mechanics*, 6th Edition, Academic Press.

5. Shan X., Yuan X.-F., Chen H. (2006), *Kinetic theory representation of hydrodynamics: a way beyond the Navier-Stokes equation*, J. Fluid Mech. 550, 413-441.

6. Ambruș V. E., Sofonea V. (2016), *Lattice Boltzmann models based on half-range Gauss-Hermite Hermite quadratures*, J. Comput. Phys. 316, 1-29.

7. Janert P. K. (2016), *Gnuplot in action: Understanding data with graphs*, Manning Publications Co., Shelter Islands, NY, USA.

8. Sanders J., Kandrot E. (2010), *CUDA by example: An introduction to general-purpose GPU programming*, Addison-Wesley Professional.

9. User manual Mathematica and Maple.

1. Derouillat M. et al. J. (2018), *SMILEI: A collaborative, open-source, multi-purpose particle-in-cell code for plasma simulation*. Computer Physics Communications, 222:351–373.

2. Vranic et al. (2014), *All-Optical Radiation Reaction at 10^{21} W/cm^2*, Physical Review Letters 113, 134801.

3. Debayle A. et al. (2017) *Electron heating by intense short pulse lasers propagating through near-critical plasmas*. New Journal of Physics, 19(123013).

4. Lobet M. et al. (2016), *Modeling of radiative and quantum electrodynamics effects in pic simulations of ultra-relativistic laser-plasma interaction*. Journal of Physics: Conference Series, 688(012058).

5. Mishra R. et al. (2018), *Model for ultra-intense laser-plasma interaction at normal incidence.* New Journal of Physics, 20(043047).

6. Mulser Peter, Bauer Dieter (2010), *High Power Laser-Matter Interaction*, STMP 238, Springer, Berlin Heidelberg.

7. Eliezer Shalom (Ed) (2002), *The interaction of High-Power Lasers with Plasmas*, Institute of Physics Publishing, IOP, Bristol and Philadelphia.

8. Batani D., Joachain C. J., Martellucci S., Chester A. N. (Eds) (2001), *Atoms, Solids, and Plasmas in Super-Intense Laser Fields*, Springer Science + Business Media LLC, Springer, New York 2001)

9. Joachain C. J., Kylstra N. J., Potvliege R. M. (2012), *Atoms in Intense Laser Fields*, Cambridge University Press, New York.

10. Colvin Jeff, Larsen Jon (2014), *Extreme Physics. Properties and Behavior of Matter at Extreme Conditions*, Cambridge University Press, New York.