

---

## Editorial from the Editor in Chief

# Pulse power, high energy density, warm dense matter and fusion science in 2008

---

You are just holding the first issue in 2008 of our journal *Laser and Particle Beams* in your hand. We can look back to a quite successful year 2007, where we have published 71 research articles and one review articles. This is practically the same amount of publications as in previous years and the topics ranged from inertial fusion to fundamental problems of beam interaction with matter including also pulse power, high energy density physics and warm dense matter. Especially the field of Warm Dense Matter seems to enjoy an increasing interest and has been addressed by several authors in our journal (Cao *et al.*, 2007; Sasaki *et al.*, 2006; Deutsch & Popoff, 2006). This journal will make an effort to cover the development of this interesting new field in great detail.

The major part of publications submitted to *Laser and Particle Beams* addressed interaction phenomena of intense laser or particle beams with ionized matter (Laska *et al.*, 2007; Földes, 2007; Gupta *et al.*, 2007; Borghesi *et al.*, 2007; Beilis, 2007), diagnostic methods (Faenov *et al.*, 2007; Nardi *et al.*, 2007), and the phenomenon of accelerated particle beams in intense laser fields (Flippo *et al.*, 2007; Shij, 2007; Karmarkar, 2007; Nickles, 2007). In 2008, the XXX ECLIM conference will be held in September in Darmstadt. *Laser and Particle Beams* will offer to publish exciting scientific results that will be presented there, since the main topics of the conference e.g., Equation of State, Inertial Fusion Energy, Fast Ignition, Laser Acceleration, Laser and Ion Beam Interaction with Matter constitute the major part of the research fields covered by this journal.

It is very encouraging to see the impact factor for *Laser and Particle Beams* rising steadily. This year we may expect the impact factor to rise again from 3.9 to about 4.4. Thus *Laser and Particle Beams* has the highest impact factor of all journals in the applied physics dealing with plasma physics issues. Among the Essential Science Indicators<sup>SM</sup> there is a section called highly cited papers. These are papers published within the last 10 year period which are significantly more often cited than the average. Here I find it worthwhile to mention that this prestigious

category holds a number of publications from *Laser and Particle Beams*. The list contains highly cited papers in 2007 (Gupta & Suk, 2007; Flippo *et al.*, 2007), in 2006 (Yin *et al.*, 2006; Lifschitz *et al.*, 2006), in 2005 (Schaumann *et al.*, 2005; Neumayer *et al.* 2005; Hora, 2005; Badziak *et al.*, 2005; Roth *et al.*, 2005; Hoffmann *et al.*, 2005), and also one already from 2004 (Hora, 2004). We take this as an indication of the high quality of papers submitted and published in this journal.

In the years to come, we want to offer our authors a new options. One of these innovations, I like to call the pioneer section. Since it may be very interesting for the younger generation of researchers to trace down the roots of our field, I want to offer authors the possibility to introduce us to the early development of our field. The paper by Winterberg (2008) is an example of this. Previously classified material is published and related to new ideas and the current development. At the XXIX ECLIM conference in Madrid there was a special pioneers section and this had drawn a lot of attention. Another novelty to *Laser and particle Beams* will be an invited experts review section where several expert authors will be invited to review the progress of their field of expertise and write a common paper where each author is responsible for his or her respective chapter. I hope that these new options will add to the quality and reputation of the journal.

## REFERENCES

- BADZIAK, J., GLOWACZ, S., JABLONSKI, S., PARYS, P., WOLOWSKI, J. & HORA, H. (2005). Laser-driven generation of high-current ion beams using skin-layer ponderomotive acceleration. *Laser Part. Beams* **23**, 401–409.
- BEILIS, I.I. (2007). Laser plasma generation and plasma interaction with ablative target. *Laser Part. Beams* **25**, 53–63.
- BORGHESI, M., KAR, S., ROMAGNANI, L., TONCIAN, T., ANTICI, P., AUDEBERT, P., BRAMBRINK, E., CECCHERINI, F., CECCHETTI, C.A., FUCHS, J., GALIMBERTI, M., GIZZI, L.A., GRISMAYER, T., LYSEIKINA, T., JUNG, R., MACCHI, A., MORA, P., OSTERHOLTZ, J.,

- SCHIAVI, A. & WILLI, O. (2007). Impulsive electric fields driven by high-intensity laser matter interactions. *Laser Part. Beams* **25**, 161–167.
- CAO, L. F., USCHMANN, I., ZAMPONI, F., KAMPFER, T., FUHRMANN, A., FORSTER, E., HOLL, A., REDMER, R., TOLEIKIS, S., TSCHENTSCHER, T. & GLENZER, S.H. (2007). Space-time characterization of laser plasma interactions in the warm dense matter regime. *Laser Part. Beams* **25**, 239–244.
- DEUTSCH, C. & POPOFF, R. (2006). Low velocity ion stopping of relevance to the US beam-target program. *Laser Part. Beams* **24**, 421–425.
- FAENOV, A. Y., MAGUNOV, A.I., PIKUZ, T.A., SKOBELEV, I.Y., GASILOV, S.V., STAGIRA, S., CALEGARI, F., NISOLI, M., DE SILVESTRI, S., POLETTI, L., VILLORESI, P. & ANDREEV, A.A. (2007). X-ray spectroscopy observation of fast ions generation in plasma produced by short low-contrast laser pulse irradiation of solid targets. *Laser Part. Beams* **25**, 267–275.
- FLIPPO, K., HEGELICH, B.M., ALBRIGHT, B.J., YIN, L., GAUTIER, D.C., LETZRING, S., SCHOLLMEIER, M., SCHREIBER, J., SCHULZE, R. & FERNANDEZ, J.C. (2007). Laser-driven ion accelerators: Spectral control, monoenergetic ions and new acceleration mechanisms. *Laser Part. Beams* **25**, 3–8.
- FOLDES, I.B. (2007). Guest editorial: IAMP2006: International Conference on the Interaction of Atoms, Molecules and Plasmas with Intense Ultrashort Laser Pulses. *Laser Part. Beams* **25**, 331–332.
- GUPTA, D.N. & SUK, H. (2007). Electron acceleration to high energy by using two chirped lasers. *Laser Part. Beams* **25**, 31–36.
- GUPTA, M. K., SHARMA, R.P. & MAHMOUD, S.T. (2007). Generation of plasma wave and third harmonic generation at ultra relativistic laser power. *Laser Part. Beams* **25**, 211–218.
- HOFFMANN, D.H.H., BLAZEVIC, A., NI, P., ROSMEI, O., ROTH, M., TAHIR, N.A., TAUSCHWITZ, A., UDREA, S., VARENTSOV, D., WEYRICH, K. & MARON, Y. (2005). Present and future perspectives for high energy density physics with intense heavy ion and laser beams. *Laser Part. Beams* **23**, 47–53.
- HORA, H. (2004). Developments in inertial fusion energy and beam fusion at magnetic confinement. *Laser Part. Beams* **22**, 439–449.
- HORA, H. (2005). Difference between relativistic petawatt-picosecond laser-plasma interaction and subrelativistic plasma-block generation. *Laser Part. Beams* **23**, 441–451.
- KARMAKAR, A. & PUKHOV, A. (2007). Collimated attosecond GeV electron bunches from ionization of high-Z material by radially polarized ultra-relativistic laser pulses. *Laser Part. Beams* **25**, 371–377.
- LASKA, L., BADZIAK, J., GAMMINO, S., JUNGWIRTH, K., KASPERCZUK, A., KRASA, J., KROUSKY, E., KUBES, P., PARYS, P., PFEIFER, M., PISARCZYK, T., ROHLENA, K., ROSINSKI, M., RYC, L., SKALA, J., TORRISI, L., ULLSCHMIED, J., VELYHAN, A. & WOLOWSK, J. (2007). The influence of an intense laser beam interaction with preformed plasma on the characteristics of emitted ion streams. *Laser Part. Beams* **25**, 549–556.
- LIFSCHITZ, A.F., FAURE, J., GLINEC, Y., MALKA, V. & MORA, P. (2006). Proposed scheme for compact GeV laser plasma accelerator. *Laser Part. Beams* **24**, 255–259.
- NARDI, E., MARON, Y. & HOFFMANN, D.H.H. (2007). Plasma diagnostics by means of the scattering of electrons and proton beams. *Laser Part. Beams* **25**, 489–495.
- NEUMAYER, P., BOCK, R., BORNEIS, S., BRAMBRINK, E., BRAND, H., CAIRD, J., CAMPBELL, E.M., GAUL, E., GOETTE, S., HAEFNER, C., HAHN, T., HEUCK, H.M., HOFFMANN, D.H.H., JAVORKOVA, D., KLUGE, H.J., KUEHL, T., KUNZER, S., MERZ, T., ONKELS, E., PERRY, M.D., REEMTS, D., ROTH, M., SAMEK, S., SCHAUMANN, G., SCHRADER, F., SEELIG, W., TAUSCHWITZ, A., THIEL, R., URSESCU, D., WIEWIOR, P., WITTRICK, U. & ZIELBAUER, B. (2005). Status of PHELIX laser and first experiments. *Laser Part. Beams* **23**, 385–389.
- NICKLES, P.V., TER-AVETISYAN, S., SCHNURER, M., SOKOLLIK, T., SANDNER, W., SCHREIBER, J., HILSCHER, D., JAHNKE, U., ANDREEV, A. & TIKHONCHUK, V. (2007). Review of ultrafast ion acceleration experiments in laser plasma at Max Born Institute. *Laser Part. Beams* **25**, 347–363.
- ROTH, M., BRAMBRINK, E., AUDEBERT, P., BLAZEVIC, A., CLARKE, R., COBBLE, J., COWAN, T.E., FERNANDEZ, J., FUCHS, J., GEISSEL, M., HABS, D., HEGELICH, M., KARSCH, S., LEDINGHAM, K., NEELY, D., RUHL, H., SCHLEGEL, T. & SCHREIBER, J. (2005). Laser accelerated ions and electron transport in ultra-intense laser matter interaction. *Laser Part. Beams* **23**, 95–100.
- SASAKI, T., YANO, Y., NAKAJIMA, M., KAWAMURA, T. & HORIOKA, K. (2006). Warm-dense-matter studies using pulse-powered wire discharges in water. *Laser Part. Beams* **24**, 371–380.
- SCHAUMANN, G., SCHOLLMEIER, M.S., RODRIGUEZ-PRieto, G., BLAZEVIC, A., BRAMBRINK, E., GEISSEL, M., KOROSTIY, S., PIRZADEH, P., ROTH, M., ROSMEI, F.B., FAENOV, A.Y., PIKUZ, T.A., TSIGUTKIN, K., MARON, Y., TAHIR, N.A., HOFFMANN, D.H.H. (2005). High energy heavy ion jets emerging from laser plasma generated by long pulse laser beams from the NHELIX laser system at GSI. *Laser Part. Beams* **23**, 503–512.
- SHI, Y.J. (2007). Laser electron accelerator in plasma with adiabatically attenuating density. *Laser Part. Beams* **25**, 259–265.
- WINTERBERG, F. (2008). Lasers for inertial confinement fusion driven by high explosives. *Laser Part Beams* **26**, 135–143.
- YIN, L., ALBRIGHT, B.J., HEGELICH, B.M. & FERNANDEZ, J.C. (2006). GeV laser ion acceleration from ultrathin targets: The laser break-out afterburner. *Laser Part. Beams* **24**, 291–298.
- ZHOU, C.T., YU, M.Y. & HE, X.T. (2007) Electron acceleration by high current-density relativistic electron bunch in plasmas. *Laser Part. Beams* **25**, 313–319.