

## **PUBLICATIONS (FY0809):**

M. A. Angelova, B. S. Bauer, R. E. Siemon, I. R. Lindemuth and V. Makhin, “Sensitivity of  $m=0$  Instability to Different Resistivity Models”, IEEE Transactions on Plasma Science, VOL. **36**, NO. 1, (February 2008).

P. Antici, J. Fuchs, M. Borghesi, L. Gremillet, T. Grismayer, Y. Sentoku et al., “Hot and Cold Electron Dynamics Following High-Intensity Laser Matter Interaction”, Phys. Rev. Lett., **101**, 105004 (2008).

P. Antici, J. Fuchs, E. d'Humieres, J. Robiche, E. Brambrink, S. Atzeni, A. Schiavi, Y. Sentoku, P. Audebert and H. Pepin, “Laser acceleration of high-energy protons in variable density plasmas”, New J. Phys. **11**, 023038 (2009).

P. Antici, J. Fuchs, E. d'Humieres, E. Lefebvre, M. Borghesi, E. Brambrink, C.A. Cecchetti, S.A. Gaillard, L. Romagnani, Y. Sentoku, T. Toncian, P. Audebert, H. Pepin, "Generation of MeV-Range Protons From 30–100 nm Solid Targets by Ultra-High-Contrast Laser Pulses", IEEE Trans. Plasma Science **36**, 1817-1820 (2008).

D. Batani, S. Baton, M. Koenig, P. Guillou, B. Loupiau, T. Vinci, C. Rousseaux, L. Gremillet, A. Morace, R. Redaelli, M. Nakatsutsumi, R. Kodama, N. Ozaki, T. Norimatsu, J. Rassuchine, T. Cowan, F. Dorchies, C. Fourment, J.J. Santos, “Recent experiment on fast electron transport in ultra-high intensity laser interaction”, J. Phys.: Conf. Ser. **112**, 022048 (2008).

R. K. Bista, R. F. Bruch, A.M. Covington, “Variable Temperature Raman spectro-microscopy for a comprehensive analysis of the conformational order in PEGylated lipids”, Journal of Raman Spectroscopy, Vol. **21**, No. 56 (September 2008).

R. K. Bista, R. F. Bruch, A. M. Covington, A. Sorger, T. Gerstmann and A. Otto, “Investigations of thermotropic phase behavior of newly developed synthetic PEGylated lipids using Raman Spectro-microscopy”, Biopolymers, Vol. **89**, No. 11, 1012-1020 (June 2008).

C. Constantin, W. Gekelman, P. Pribyl, E. Everson, D. Schaeffer, N. Kugland, R. Presura, S. Neff, C. Plechaty, S. Vincena, A. Collette, S. Tripathi, M. Villagran Muniz, and C. Niemann, “Collisionless interaction of an energetic laser produced plasma with a large magnetoplasma”, Astrophysics and Space Science **322**, 155-159 (2009).

C. A. Coverdale, A.S. Safronova, V.L. Kantsyrev, N.D. Quart, A.A. Esaulov, C. Deeney, K.M. Williamson, G.C. Osborne, I. Shrestha, D.J. Ampleford, B. Jones. “Observation of  $> 400$ -eV precursor plasmas from low-wire-number copper arrays at the 1-MA Zebra facility”, Physical Review Letters, v.**102**, p.p. 105006-1÷4 (2009).

T. S. Cowan, K. A. Flipppo, and S. A. Gaillard, “Characterization of radiochromic film scanning techniques used in short-pulse-laser ion acceleration”, Rev. Sci. Instrum. **79**, 10E535 (2008).

- E. d'Humieres, Y. Sentoku, A. J. Kemp, "Ultra-fast ionization modeling in laser-plasma interaction", IOP Publishing, Jour. of Physics, **112**, 022108 (2008).
- K. A. Flippo, E. d'Humieres, S. A. Gaillard, J. Rassuchine, D. C. Gautier, et al., "Increased efficiency of short-pulse laser-generated proton beams from novel flat-top cone targets", Phys. Plasmas, **15**, 056709 (2008).
- D. C. Gautier, K. A. Flippo, S. A. Letzring, J. Workman T. Shimada, R. P. Johnson, T. R. Hurry, S. A. Gaillard, and B. M. Hegelich, "A novel backscatter focus diagnostic for the TRIDENT 200 TW laser", Rev. Sci. Instrum. **79**, 10F547 (2008).
- D. C. Gautier, J. L. Kline, K. A. Flippo, S. A. Gaillard, S. A. Letzring, and B. M. Hegelich, "A simple apparatus for quick qualitative analysis of CR39 nuclear track detectors", Rev. Sci. Instrum. **79**, 10E536 (2008).
- A. Haboub, V.V. Ivanov, A. L. Astanovitskiy, A. A. Morozov, S. D. Altemara, "Observation of cascade implosions in "star"-like wire-array z-pinchs on the ZEBRA generator", IEEE Trans. Plasma Sci. **36**, No.4, 1290, (August 2008).
- V. V. Ivanov, V. I. Sotnikov, J. M. Kindel, P. Hakel, R. C. Mancini, A. L. Astanovitskiy, A. Haboub, S. D. Altemara, A. P. Shevelko, E. D. Kazakov, P. V. Sasorov, "Implosion dynamics and x-ray generation in small-diameter wire-array z-pinchs", Phys. Rev. **E 79**, 056404, (2009).
- B. Jones, C. Deeney, J. L. McKenney, D. J. Ampleford, C. A. Coverdale, P. D. LePell, K. P. Shelton, A. S. Safronova, V. L. Kantsyrev, G. Osborne, V. I. Sotnikov, V. V. Ivanov, D. Fedin, V. Nalajala, F. Yilmaz, I. Shrestha, "Measurement of temperature, density, and particle transport with localized dopant in wire-array z pinchs", Phys. Rev. Lett. **100**, 105003 (March 2008).
- T. Johzaki, Y. Sentoku, H. Nagatomo, H. Sakagami, Y. Nakao, and K. Mima, "Core heating properties in FIREX-I", Plasma Phys. Control Fusion **51**, 014002 (2009).
- I.K. Jeong, T.W. Darling, R.H. Heffner, A. Llobet, J.C. Lashley, "Neutron diffraction study on  $\gamma \rightarrow \alpha$  phase transition in Ce 0.9 Th 0.1 alloy", Philosophical Magazine Letters, Vol. **88** Issue 8, p607-613 (August 2008) .
- V. L. Kantsyrev, L. I. Rudakov, A. S. Safronova, A. A. Esaulov, A. S. Chuvatin, C. A. Coverdale, C. Deeney, K. M. Williamson, M. F. Yilmaz, I. Shrestha, N. D. Quart, G. C. Osborne. "Double planar wire array as a compact plasma radiation source".Physics of Plasmas, Vol. **15**, 030704 (2008).

V.L. Kantsyrev, A.S. Safronova, A.A. Esaulov, K.M. Williamson, I. Shrestha, F. Yilmaz, G.C. Osborne, M.E. Weller, N.D. Quart, V.V. Shlyaptseva, L.I. Rudakov, A.S. Chuvatin, A.L. Velikovich, "A review of new wire arrays with open and closed magnetic configurations at the 1.6 MA Zebra generator for radiative properties and opacity effects". High Energy Density Physics, Vol. **5**, p.p. 115-123 (2009).

G. Kaplan, T.W. Darling, K.R. McCall, "Resonant ultrasound spectroscopy and homogeneity in polycrystals" Ultrasonics, Vol. **49**, Number 1, pp 139-142 (January 2009).

A. J. Kemp, Y. Sentoku, M. Tabak, "Hot electron energy coupling in ultra-intense laser matter interaction", Physical Review Letters, Vol. **101**, 075004 (2008).

R.G. Kraus, E.D. Emmons, J.S. Thompson, A.M. Covington, "Infrared Absorption Spectroscopy of Polycarbonate at High Pressure", Journal of Polymer Science, Part B, Polymer Physics, Vol. **46** 734-742 (2008).

A. Mančić, J. Fuchs, P. Antici, S. A. Gaillard, and P. Audebert, "Absolute calibration of photostimulable image plate detectors used as (0.5--20 MeV) high-energy proton detectors", Rev. Sci. Instrum. Vol. **79**, 073301 (2008).

D. Martinez, R. Presura, S. Wright, C. Plechaty, S. Neff, L. Wanex, D. Ampleford, "Generation of shear flow in conical wire arrays with a center wire", Astrophysics and Space Science, vol.**322**, pp. 205-208, (November 2008).

T. Matsuoka, A. Lei, K. Adumi, J. Zheng, R. Kodama, Y. Sentoku, "Focus optimization of relativistic self-focusing for anomalous laser penetration into overdense plasmas", Plasma Phys. Control Fusion, **50**, 105011 (2008).

R.E.A. McKnight, T. Moxon, A. Buckley, P.A. Taylor, T.W. Darling, M.A. Carpenter, "Grain size dependence of elastic anomalies accompanying the  $\alpha$ - $\beta$  phase transition in polycrystalline quartz" Journal of Physics: Condensed Matter, vol.**20**, no.7, 075229 (February 2008).

H. Nakamura, B. Chrisman, T. Tanimoto, M. Borgesi, K. Kondo, M. Nakatsutsumi, T. Norimatsu, M. Tampo, K. A. Tanaka, T. Yabuuchi, Y. Sentoku, and R. Kodama, "Superthermal and efficient-heating modes in the interaction of a cone target with ultraintense laser light", Phys. Rev. Lett. **102**, 045009 (2009).

S. Neff, S. Wright, J. Ford, R. Royle, R. Presura, "Faraday cup measurements of the energy spectrum of laser-accelerated protons", IEEE Transactions on Plasma Science **36**, 2775-2779 (2008).

S. Neff, J. Ford, S. Wright, D. Martinez, C. Plechaty, R. Presura, "Magnetically accelerated foils for shock wave experiments", Astrophysics and Space Science, vol. **322**, pp. 189-193, (January 2009).

P. Norreys, F. N. Beg, Y. Sentoku, L. O. Silva, R. A. Smith, and R. M. G. M. Trines, “Intense laser-plasma interactions: New frontiers in high energy density physics”, *Phys. Plasmas* **16**, 041002 (2009).

I. Paraschiv, B.S. Bauer, I.R. Lindemuth, V. Makhin, “Linear and nonlinear development of the  $m=0$  instability in z-pinch equilibria with axial sheared flows”, *Journal of Fusion Energy* **28**, 195 (2009).

C. Plechaty, R. Presura, S. Wright, S. Neff, A. Haboub, “Penetration of a plasma across a magnetic field”, *Astrophysics and Space Science*, vol. **322**, pp. 201-204, (February 2009).

J. Rassuchine, E. d’Humieres, S. D. Baton, P. Guillou, M. Koenig, M. Chahid, F. Perez, J. Fuchs, P. Audebert, R. Kodama, M. Nakatsutsumi, N. Ozaki, D. BAtani, A. Morace, R. Redaelli, L. Gremillet, C. Rousseaux, F. Dorchies, C. Fourment, J. J. Santos, J. Adams, G. Korgan, S. Malekos, S. B. Hansen, R. Shepherd, K. Flippo, S. Gaillard, Y. Sentoku, and T. E. Cowan, “Enhanced hot-electron localization and heating in high-contrast ultraintense laser irradiation of microcone targets”, *Phys. Rev. E* **79**, 036408 (2009).

N. Renard-Le Galloudec, E. D’Humieres, B. I. Cho, J. Osterholz, Y. Sentoku and T. Ditmire, “Guiding, focusing, and collimated transport of hot electrons in a canal in the extended tip of cone targets”, *Phys. Rev. Lett.* **102**, 205003 (2009).

N. Renard-Le Galloudec, B. I. Cho, J. Osterholz, and T. Ditmire, “Controlled reproducible alignment of cone targets and mitigation of preplasma in high intensity laser interactions”, *Rev. Sci. Instrum.*, **79**, 8, 083506, (August 2008 ).

A.S. Safronova, V.L. Kantsyrev, A.A. Esaulov, N.D. Quart, M.F. Yilmaz, K.M. Williamson, V. Shlyaptseva, I. Shrestha, G.C. Osborne, C.A. Coverdale, B. Jones, C. Deeney, “X-ray diagnostics of imploding plasmas from planar wire arrays composed of Cu and few tracer Al wires on the 1 MA pulsed power generator at UNR”, *Review of Scientific Instruments*, v. **79**, p.p. 10E315-1÷4 (2008).

A.S. Safronova, V.L. Kantsyrev, A.A. Esaulov, N.D. Quart, U.I. Safronova, I. Shrestha, K.M. Williamson. “X-ray spectroscopy and imaging of stainless steel X-pinchs with application to astrophysics”, *European Physical Journal, Special Topics*, v.**169**, p.p. 155-158 (2009).

M. Schollmeier, S. Becker, M. Geissel, K. A. Flippo, A. Blazevic, S. A. Gaillard, D. C. Gautier, F. Gruner, K. Harres, M. Kimmel, F. Nurnberg, P. Rambo, U. Schramm, J. Schreiber, J. Schutrumpf, J. Schwarz, N. A. Tahir, B. Atherton, D. Habs, B. M. Hegelich, and M. Roth, “Controlled Transport and Focusing of Laser-Accelerated Protons with Miniature Magnetic Devices”, *Phys. Rev. Lett.* **101**, 055004 (2008).

Y. Sentoku, A. J. Kemp, “Numerical methods for particle simulations at extreme densities and temperatures”, *Journal Comp. Phys.*, **227**, 6846 (2008).

V. I. Sotnikov, V. V. Ivanov, R. Presura, E. Yassin, J. Kindel, J. N. Leboeuf, O. G. Onishchenko, B.V. Oliver, B. Jones, T. A. Mehlhorn, C. Deeney, "Investigation of flute mode instability in application to laboratory astrophysics and z-pinch experiments", *Astrophys. and Space Sci.* **322**, 209-213 (2009).

J.N. Walsh, P.A. Taylor, A. Buckley, T.W. Darling, J. Schreuer, M.A. Carpenter, "Elastic and anelastic anomalies in (Ca,Sr)TiO<sub>3</sub> perovskites: Analogue behaviour for silicate perovskites" *Physics of the Earth & Planetary Interiors*, Vol. **167**, Issue 1/2, p110-117 (March 2008).

J. Weichsel, T. Fuchs, E. Lefebvre, E. d'Humieres and U. Oelfke, "Spectral features of laser-accelerated protons for radiotherapy applications", *Phys. Med. Biol.* **53**, 4383 (2008).

P. P. Wiewior, A. Astanovitskiy, G. Aubry, S. Batie, J. Caron, O. Chalyy, T. Cowan, C. Haefner, B. Le Galloudec, N. Le Galloudec, D. Macaulay, V. Nalajala, G. Pettee, S. Samek, Y. Stepanenko and J. Vesco, "Status of the Leopard Laser Project in Nevada Terawatt Facility", *Journal of Fusion Energy*, vol. **28**. no. 2, pp. 218-220 (June 2009).

S. Wright, R. Presura, A. Esaulov, S. Neff, C. Plechaty, D. Martinez, A. Haboub, "Kelvin Helmholtz Instabilities Actuated by an External Magnetic Field", *Astrophysics and Space Science* **322**, 201-204 (2009).

M.F. Yilmaz, A.S. Safronova, V.L. Kantsyrev, A.A. Esaulov, K.M. Williamson, G.C. Osborne, I. Shrestha, N.D. Quart, "Spectroscopic features of implosions of Mo single- and double-planar wire arrays produced on the 1 MA Z-pinch generator", *Journal of Quantitative Spectroscopy and Radiative Transfer*, v.**109**, p.p. 2877- 2890 (2008).