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Publications by GTI Staff on Application of Laser Technology to Well Construction and Completion

1. Batarseh, S.I., Gahan, B.C., Sharma, B.C., R. 2005. **"Innovation in Wellbore Perforation Using High Power Laser,"** IPTC Paper 10981, International Petroleum Technology Conference, Doha, Qatar, November 21-23.
2. Gahan, B.C. **"Putting the Pressure on Fiber Laser Perforations"** (pdf 461 KB) GTI Document No. GTI-05/0243, *GasTIPS*, 11, No. 4 (Fall 2005), pp. 18-21.
3. Gahan, B.C., Batarseh, S., Watson, R., Deeg, W. 2005. **"Effect of Downhole Pressure Conditions on High-Power Laser Perforation,"** SPE Paper 97093, SPE Annual Technical Conference and Exhibition, Dallas, TX, October 9-12.
4. Gahan, B.C. "Processing Rocks," *Industrial Laser Solutions*, Sept.(2005):16-18.
5. Gahan, B.C. **"Fiber Laser Offers Fast Track to Clean Perforations"** (pdf 277 KB), GTI Document No. GTI-05/0226, *GasTIPS*, 11, No. 2 (Spring 2005), pp. 17-20.
6. Gahan, B.C., Batarseh, S. 2004. **"An Overview of High Power Laser Applications Research from Well Construction and Completion,"** (pdf 553 KB), 2004 International Gas Research Conference (IGRC), Vancouver, BC, November 1-4.
7. Batarseh, S., Gahan, B.C., Sharma, B., Gowelly, S. 2004. **"Evaluation of High Power Ytterbium Fiber Lasers for Rock Cutting and Removal Applications,"** Paper 1402, 23rd International Congress on Applications of Lasers and Electronics, San Francisco, CA, October 4-7.
8. Gahan, B.C., Batarseh, S., Reilly II, J.F., Wilcox, B.H. 2004. **"Geological Investigation of the Lunar and Martian Surface and Subsurface Using High Power Lasers,"** Paper AIAA-2004-6046, American Institute of Aeronautics and Astronautics (AIAA) Space 2004 Conference and Exhibit, San Diego, CA, September 28-30.
9. Gahan, B.C., Batarseh, S., Sharma, B., Gowelly, S. 2004. **"Analysis of Efficient High-Power Fiber Lasers for Well Perforation,"** SPE Paper 90661, SPE Annual Technical Conference and Exhibition, Houston, TX, September 26-29.
10. Batarseh, S., Gahan, B.C. 2004. **"Deep Hole Penetration of Rock for Oil Production Using Ytterbium Fiber Laser,"** SPIE Poster 5448-98, SPIE High-Power Laser Ablation V, Taos, NM, April 25-30.
11. Gahan, B.C., Shiner, B. 2004. **"New High-Power Fiber Laser Enables Cutting-Edge Research"** (pdf 206 KB), GTI Document No. GTI-03/0207, *GasTIPS*, 10, No. 1 (Winter 2004), pp. 29-31.
12. Gahan, B.C., Batarseh, S., Parker, R.A. 2003. **"Lasers May Offer Alternative to Conventional Wellbore Perforation Techniques"** (pdf 268 KB), GTI Document No. GTI-03/0153, *GasTIPS*, 9, No. 4 (Fall 2003), pp. 25-29.
13. Batarseh, S., Gahan, B.C., Parker, R., Graves, R. 2003. **"Rock Phase Control by Using High Power Laser for Production Enhancements,"** Paper 505, 22nd International Congress on

Applications of Lasers and Electronics, Jacksonville, FL, October 13-16.

14. Parker, R., Xu, Z., Reed, C., Graves, S., Gahan, B.C., Batarseh, S. 2003. **"Drilling Large Diameter Holes in Rocks Using Multiple Laser Beams,"** Paper 504, 22nd International Congress on Applications of Lasers and Electronics, Jacksonville, FL, October 13-16.
15. Reed, C., Xu, Z., Parker, R., Graves, S., Gahan, B.C., Batarseh, S., Deeg, W. 2003 **"Laser Rock Drilling for Oil and Gas Wells,"** 2003 AAPG Mid-Continent Section Meeting, Tulsa, OK, October 12-14.
16. Batarseh, S., Gahan, B.C., Graves, R., Parker, R. 2003. **"Well Perforation Using High-Power Lasers,"** SPE Paper 84418, SPE Annual Technical Conference and Exhibition, Denver, CO, October 5-8.
17. Parker, R., Gahan, B.C., Graves, R., Batarseh, S., Xu, Z., Reed, C. 2003. **"Laser Drilling: Effects of Beam Application Methods on Improving Rock Removal,"** SPE Paper 84353, SPE Annual Technical Conference and Exhibition, Denver, CO, October 5-8.
18. Xu, Z., Reed, C., Parker, R., Gahan, B., Batarseh, S., Graves, R., Figueroa, H., W. Deeg. 2003. "Application Of High Powered Lasers To Drilling And Completing Deep Wells," Topical Report ANL/TD/TM03-02, DOE/NGOTP Contract Number 49066, June 2003.
19. Xu, Z., Reed, C., Kornecki, G., Gahan, B., Parker, R., Batarseh, S., Graves, R., Figueroa, H., Skinner, N., 2003. "Specific Energy for Pulsed Laser Rock Drilling," Journal of Laser Applications 15(2003):25-30.
20. Graves, R., Batarseh, S., Parker, R., Gahan, B. 2002. **"Temperatures Induced by High Power Lasers: Effects on Reservoir Rock Strength and Mechanical Properties,"** SPE/ISRM Paper 78154, SPE/ISRM Rock Mechanics Conference, Irving, TX, October 20-23.
21. Xu, Z., Reed, C., Gahan, B., Parker, R., Batarseh, S., Graves, R., Figueroa, H. 2002. **"Laser Rock Drilling by a Super-pulsed CO2 Laser Beam,"** 21st International Congress on Applications of Lasers and Electronics, Scottsdale, AZ, October 14-17.
22. Graves, R., Araya, A., Gahan, B., Parker, R. 2002. SPE, **"Comparison of Specific Energy Between Drilling With High Power Lasers and Other Drilling Methods,"** SPE Paper 77627, Annual Technical Conference and Exhibition of the Society of Petroleum Engineers, San Antonio, Texas, September 29 - October 2.
23. Gahan, B.C., Batarseh, S, Siegfried, R.W. 2002. **"Improving Gas Well Drilling and Completion with High Energy Lasers,"** (pdf 144 KB), GTI Natural Gas Technologies Annual Conference and Exhibition, Orlando, FL, September 30 - October 2.
24. Figueroa, H.G., LeGreca, A., Gahan, B.C., Parker, R.A., Graves, R.M., Batarseh, S., Skinner, N., Reed, C.B., Xu, Z. 2002. **"Rock Removal Using High Power Lasers For Petroleum Exploitation Purposes,"** SPIE paper 4760-89, International Society for Optical Engineering's International Symposium on High-Power Laser Ablation 2002, Taos, NM, April 21-26.
25. Gahan, B.C. 2002. **"Laser Drilling: Understanding Laser/Rock Interaction Fundamentals"** (pdf 4.00 MB), GTI Document No. GRI-02/0121, *GasTIPS*, 8, No. 2 (Spring 2002), pp. 4-8.
26. Gahan, B.C., Parker, R., Graves, R., Batarseh, S., Reed, C., Xu, Z., Figueroa, H., Skinner, N. 2001. "Laser Drilling: Drilling with the Power of Light, Phase 1: Feasibility Study," DOE Topical Report, Cooperative Agreement No. DE-FC26-00NT40917.
27. Gahan, B.C., Parker, R.A., Batarseh, S., Figueroa, H., Reed, C.B., Xu, Z. 2001. **"Laser Drilling: Determination of Energy Required to Remove Rock,"** SPE paper 71466, Annual Technical Conference and Exhibition of the Society of Petroleum Engineers, New Orleans, LA September 30-October 3.
28. Xu, Z., Reed, C.B., Parker, R.A., Gahan, B.C., Graves, R., Figueroa, H. 2001. **"Specific Energy for Laser Removal and Destruction of Rocks,"** 20th International Congress on Applications of Lasers and Electronics, Jacksonville, FL October 15-18.

For more information on GTI research on the use of laser technology for well construction and completion, contact the Exploration & Production Center, explorationproduction@gastechnology.org.