**O-FIB and beyond: Pursuing super-resolution in fs laser 3D manufacturing**

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Femtosecond laser manufacturing is unique in three-dimensional (3D) prototyping capability, and it also may be utilized for producing fine structures from hard-processing transparent materials due to the high-field feature of a femtosecond laser. A natural question is how nanoscale fabrication accuracy may be achieved since the light- solid matter interactions are generally violent. Here we report several new findings that we prove valid to minimize interaction volume, including optical far-field induced near-field breakdown (O-FIB) effect, surface plasmon polariton imprinting effect, and combinative usage of multi-photon and threshold effect. As a result, we improve the fabrication spatial resolution of transparent solid materials from the conventional optical-diffraction limit (hundreds of nanometers) to a new limit, quantum limit, which is material dependent (several nanometers).

**Short Bio:**

****Hong-Bo Sun, received the B.S. and the Ph.D degrees in electronics from Jilin University, Changchun, China, in 1992 and 1996, respectively. He worked as a postdoctoral researcher in Satellite Venture Business Laboratory, the University of Tokushima, Japan, from 1996 to 2000, and then as an assistant professor in Department of Applied Physics, Osaka University, Japan. In 2004, he was promoted as a full professor (Changjiang Scholar) in Jilin University, and since 2017 he has been working in Tsinghua University, China. His research interests have been focused on laser precision manufacturing. He has published over 500 papers, which have been cited for over 30000 times, and H factor is 88, according to ISI search report. He is currently the executive editor-in-chief (EEIC) of Light: Science and Applications and co-editor-in-chief of PhotoniX (Both from Nature Publishing Group). He is IEEE, OSA and SPIE fellow.