Restoration of hydrogen isotopes removal by laser heating

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Although photonic methods were once under consideration as candidate for fuel removal in next-step fusion devices, after the replacement of CFC by tungsten in the ITER design, the interest in their adaptation for fusion technology significantly decreased. Nevertheless, since detritation still appears to be unavoidable, laser cleaning should be restored as the technique offering extreme flexibility, excellent control and superior energy efficiency in comparison to any other technique of remote surface heating. This features have been achieved thank to massive progress of laser technology in recent years and made laser cleaning dominant in numerous industrial fields.

In this contribution simulations of surface heat distribution are presented for various wall compositions, laser irradiation conditions and scanning patterns. Practical solutions of the laser systems are proposed, which should meet the requirements defined based on the simulations.