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# Latest developments of high repetition rate TiSa lasers for laser plasma accelerators

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Laser plasma accelerators have been the subject of intensive research over the past decades since the availability of ultra high intensity lasers based on chirped pulse amplification technique. Record electron energy close to 10 GeV have been demonstrated and implementation of several controls on LPA systems combined with the use of the latest machine learning techniques have allowed very stable operation of LPA over long term runs. However the requirements for next generation high performance LPA such as EuPRAXIA as well as the need of high particle flux for medical applications such as VHEE (Very High Energy Electrons) for cancer therapy will lead to the use of higher repetition rates and higher average power lasers. In this paper we report the development of a new generation of lasers operating at a repetition rate of 100 Hz using Titanium Sapphire as active material for the main amplification stages. We report about an amplification stage delivering above 300 mJ per pulse at 100 Hz with room temperature operation thanks to optimized geometry and thermal management of the TiSa crystal. We present also the technology roadmap towards a future 1 Joule laser system working at 100 Hz and higher laser average power

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