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Wakefield simulation of solid state plasma SAHEL HAKIMI, TAM NGUYEN, DEANO FARINELLA, CALVIN LAU, HSUAN-YU WANG, PETER TABOREK, TOSHIKI TAJIMA, Univ of California - Irvine — Although it is known that the accelerating gradient of wakefield increases when laser frequency increases (i.e. critical density), there was no adequate technology to make intense X-ray laser until recently. With the advent of the invention of Thin Film Compression, we now see the intense X-ray laser technology that fits this need [1]. We have modified the EPOCH PIC code to include the lattice effect [2] of nanomaterials in our simulations. The present results indicate the accelerating gradient $\sim 0.3\frac{TeV}{cm}$ at the plasma density of $10^{23}cm^{-3}$ which agree well with the wakefield theory. This shows the concept of the solid state plasma wakefield in nanomaterials is validated by computation. This result is also consistent with previous findings [3], in which the lattice effect was neglected. [1] Tajima, T. (2014). Eur. Phys. J. **223**, 1037. [2] Tajima, T. & Ushioda, S. (1978). Phys. Rev. B **18**, 1892. [3] Zhang, X. et al., (2016). Phys. Rev. Acc. Beams **19**, 101004.

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