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**Molecular Hydrogen in Intense Ultashort Laser Pulses** ALEJANDRO SAENZ, YULIAN VANNE, MANOHAR AWASTHI, Humboldt University Berlin, 10117 Berlin (Germany) — Even for the simplest neutral stable molecule, $H_2$, the theoretical treatment of its behavior in intense laser pulses remains an unsolved challenge. In our efforts to achieve this goal, we have now developed a full *ab initio* treatment of two-electron diatomic molecules exposed to intense ultrashort laser pulses within the fixed-nuclei approximation. In contrast to previous cases the approach considers all six spatial dimensions and thus allows to investigate, e.g., also a perpendicular orientation of the molecular axis with respect to the laser field. This allows for the first time a direct comparison of the excitation and ionization dynamics of molecular hydrogen in linear polarized laser pulses with either a parallel or a perpendicular orientation of the molecule. Besides total excitation and ionization yields also more detailed information like energy and angular distributions of ejected electrons will be shown.

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