

160. Title: Widely and continuously tunable terahertz synthesizer traceable to a microwave frequency standard

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Abstract: We constructed a widely and continuously tunable terahertz frequency synthesizer traceable to a hydrogen maser linked to coordinated universal time. Photomixing of two optical frequency synthesizers, linked to the hydrogen maser via dual optical frequency combs, gave this THz synthesizer frequency uncertainty of  $10^{-12}$ . To demonstrate the potential of wide and continuous tunability in the THz synthesizer, we tuned its output frequency up to 50 GHz discretely and 1.26 GHz continuously in the F-band while maintaining the unprecedented frequency uncertainty by using a unitraveling-carrier photodiode as a photomixer. This THz synthesizer will be a powerful tool for broadband, high-precision THz spectroscopy and THz frequency metrology.