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SPECTRUM-POLARIZATION ENCODING FOR BROADBAND LASER PULSES BASED ON ROTATORY DISPERSION AND ITS POSSIBLE APPLICATIONS

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A s we know, chirped pulse amplification, a kind of time-spectrum encoding, has scaled the femto-second pulse to several petawatts. Here we report a novel technology, we call it spectrum-polarization encoding (SPE) for broadband pulse, which is realized by inducing some optical rotatory dispersion (ORD), and decoded by compensating ORD. By the aid of optical polarizers, SPE can induce spectral polarization-dependent loss and gain. Accordingly, SPE can not only work as optical filters by controlling polarization-dependent transmission to tune central wavelength or bandwidth, as a tunning component inside laser oscillator to tune output wavelength, but also be used in ultrafast light pulse shaping. Our results show SPE can help a Ti: S regenerative or multi-pass amplifier to boost an 800 nm pulse up to mJ level with a bandwidth to support few-cycle pulse duration. SPE is entirely passive thus very simple to be designed and aligned.

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