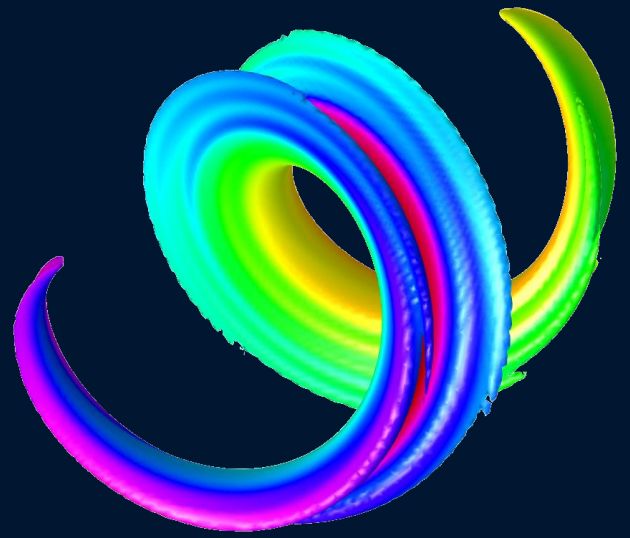
Spatiotemporal light springs with frequency chirp



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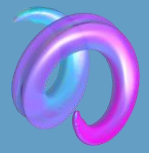

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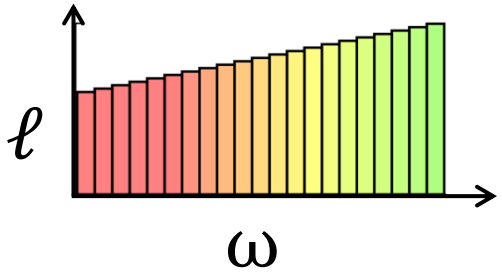
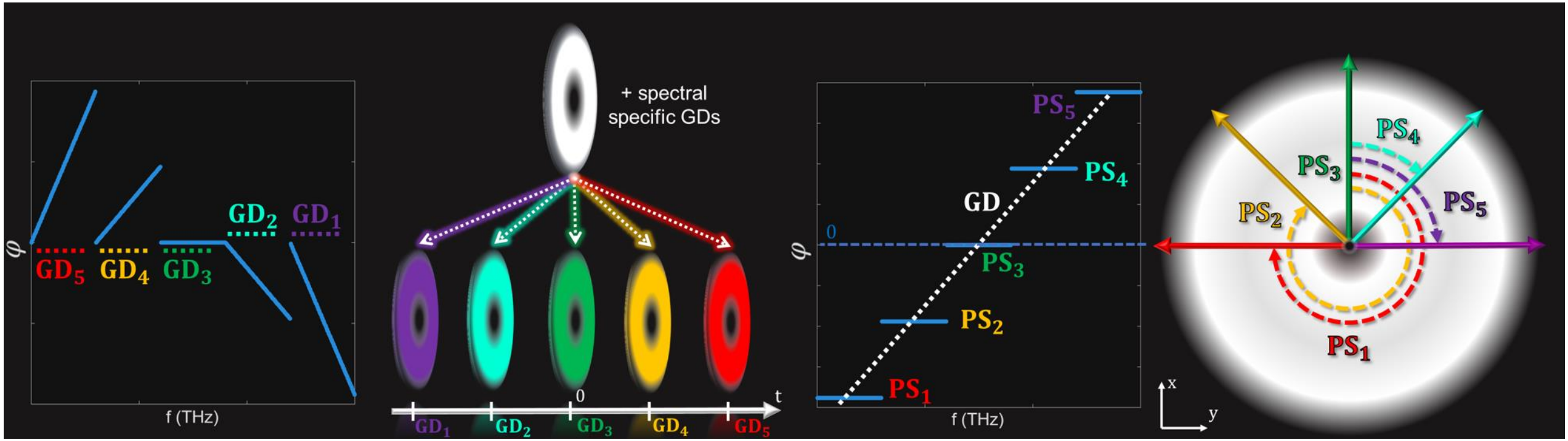
Chirped light springs

The STC is discretized in spectral sectors



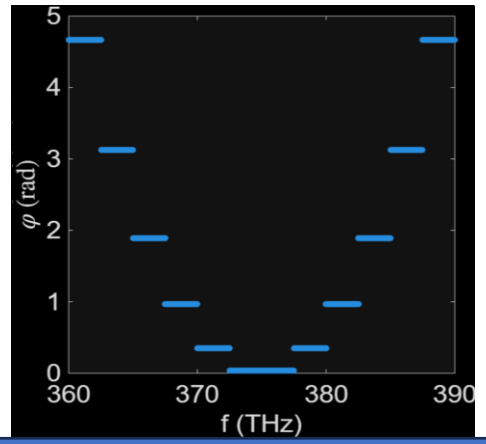
The spectral phase is discretized in the exact same way



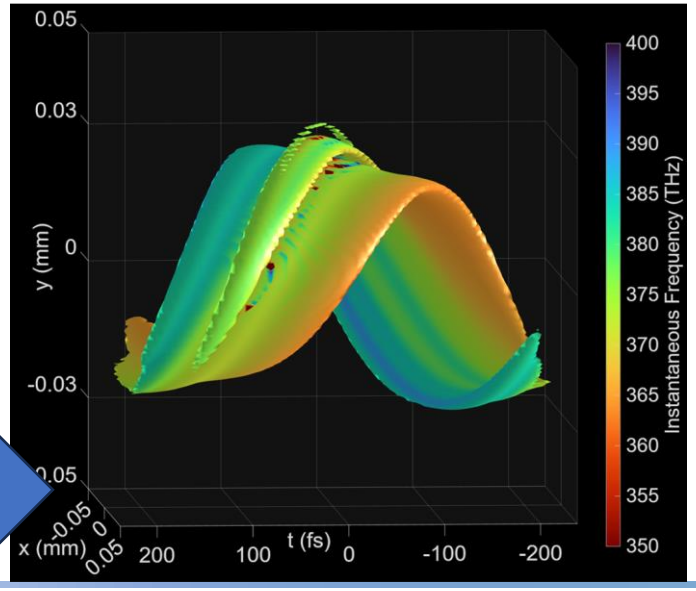
Controls the temporal position of the light spring's spectral sectors

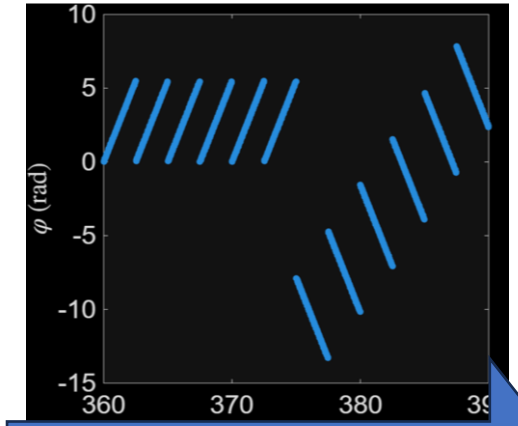
Control the rotational structure of the light spring by controlling the angular position of the spectral sectors

Chirped light springs

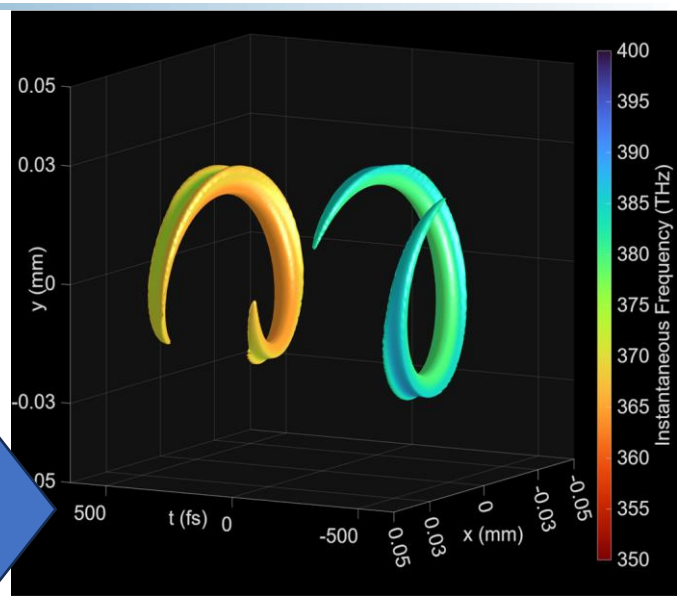


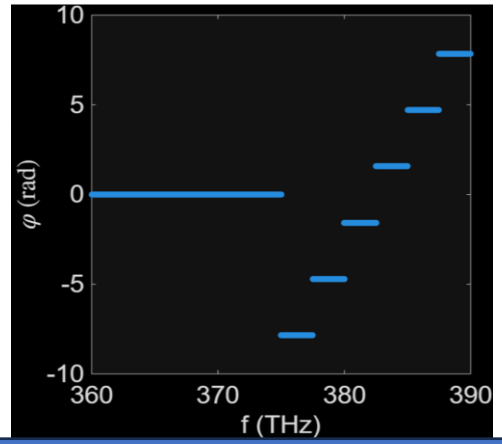
Quadratic GDD of 25 fs^2



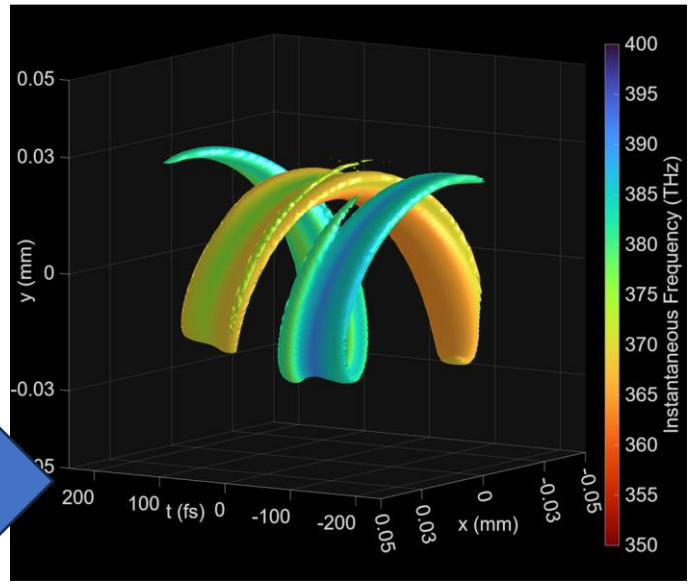


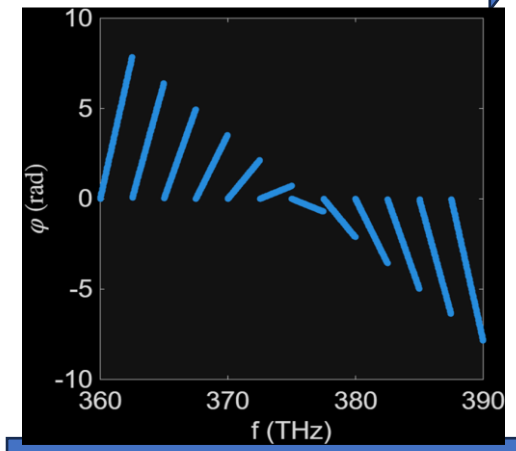
Slopes [400,-400] fs +
Steps [0, 200] fs



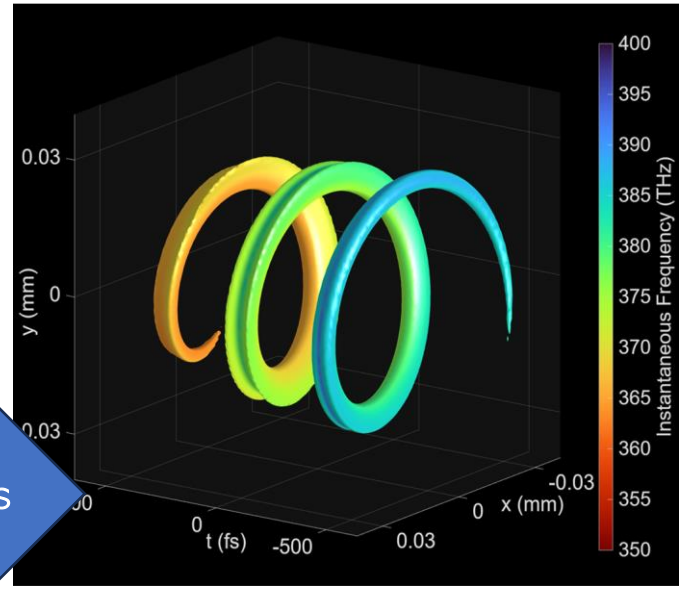


2 groups, GD [0, 200] fs



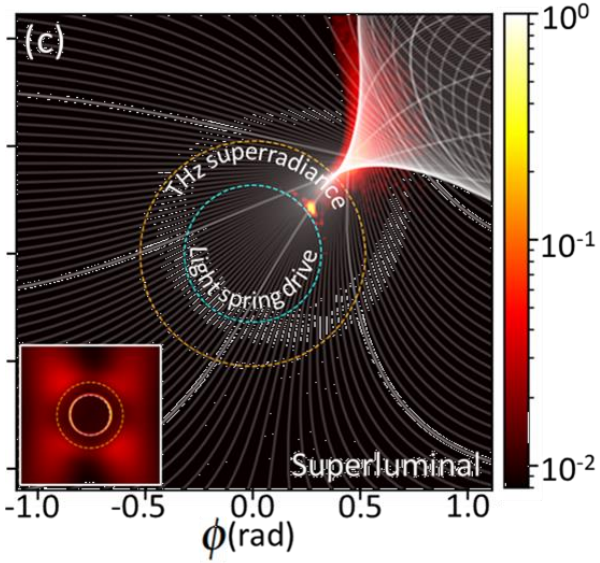


Linear variation [500,-500] fs

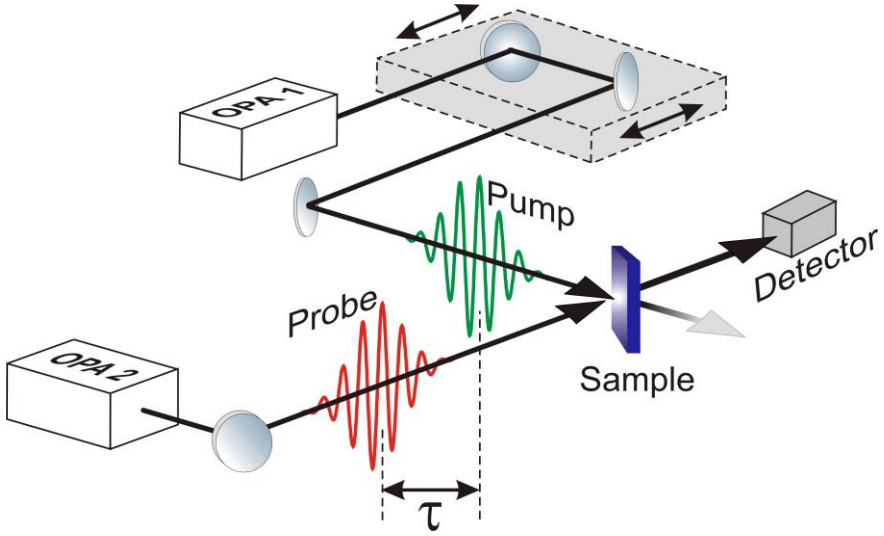


Closing remarks

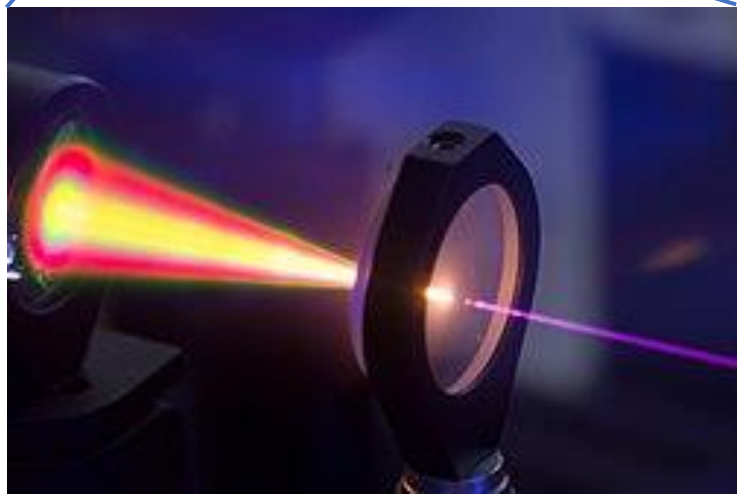
- Deliberate spectral phase control of a LS allows further manipulation of its intensity and frequency profile, achieving a wide range of effects and expanding the level of control over this type of structured beam.
- Chirp-like manipulation + new lab tools like **supercontinuum light spring generation** → new **potential applications** for LS:



Laser-plasma interactions



Ultrafast spectroscopy



[Polli, Dario. *Spectroscopy*.]

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