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Poissonian multiplicative chaos and divisor problems

The complex divisor function $\tau(n;\xi) = \sum_{d|n} d^{i\xi}$ is the Fourier transform of the sequence $\{\log d : d|n\}$. Its distribution shares many analogous properties to the Riemann zeta function: it is related to Poissonian multiplicative chaos, an object closely related to the Gaussian multiplicative chaos that rules the distribution of zeta. I will discuss the theory of the complex divisor function and study the distribution of its maximum value when ξ ranges over the interval $[1, 2]$. This is based on ongoing joint work with Louis-Pierre Arguin and Paul Bourgade.