Extreme physics with kagome hollow-core PCF

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We review the recent progress on hypocycloid-shaped core-contour (i.e. negative curvature) hollow-core photonic-crystal-fibre (HC-PCF) and its implementation for the first time in the fields of micro-wave plasma, whereby a highly stable fibre-confined argon plasma column is generated, of high optical-fields, where a femtosecond pulse was self-compressed to the sub-cycle cycle regime, of cold atom metrology where cold strontium 1D lattice is generated inside the core of Kagome HC-PCF, and of broadband laser sources where near to 6 octave Raman comb is generated in hydrogen filled HC-PCF.

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2. Debord et al. Opt. Express **21**, 25509 (2013)
3. Balciunas et al. in *Advanced Solid-State Lasers Congress 2013*, postdeadline paper JTh5A.5 (2013). And T. Balciunas, Nature Communications 6, 6117 (2015)
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Author's biography

Fetah Benabid is a CNRS director of research and honorary professor at the universities of Bath (UK) and Western Australia (Australia). He is the group leader of Gas-Phase Photonic and Microwave Materials (GPPMM) at the CNRS UMR Xlim, Limoges, France. Fetah Benabid has pioneered the development of hollow-core photonic crystal fibres (HC-PCF) and their incorporation into scientific and technological applications. He is the inventor of Kagome HC-PCF and an all-fibre gas cells, coined photonic microcell (PMC). He is the inceptor of new optical guidance mechanism called inhibited coupling optical guidance, and the "photonic tight-binding model" to explain the formation of photonic bandgap in photonic crystal fibres. Fetah Benabid research interests covers guided photonics, gas-phase based nonlinear and coherent optics.