

平成 31 年 8 月 9 日

応用物理学会北海道支部

会員各位

応用物理学会北海道支部講演会のお知らせ

下記、講演会を開催いたしますので、多数ご参加下さいますようご案内申し上げます。講演日は応用物理学会の全国大会開催期間中ですので、他のセッションとの重複を避けるため昼休みの時間に講演してもらうことにしました。講演者の Philip Russell 教授は、フォトニック結晶ファイバーの先駆的な研究者として、とても有名な先生です。ぜひ聴講にお越しください。

演題：The Curious Properties of Twisted Photonic Crystal Fibres

講師：Philip Russell 氏

(Max Planck Institute for the Science of Light and Department of Physics, Friedrich-Alexander University, Professor)

日時：令和元年 9 月 19 日 (木) 12:15 ~ 13:15

場所：北海道大学工学部応用物理学専攻会議室 A3-62

主催：応用物理学会北海道支部

講演の要旨

Helically twisted photonic crystal fibres (PCFs), formed by spinning the preform during drawing or by thermal post-processing, exhibit many fascinating properties. Whereas in an untwisted solid-core PCFs the cladding modes have effective indices that lie below the core mode index, in twisted solid-core PCFs the spiralling channels force the light to follow a longer helical path, raising its effective axial index in proportion to the square of the radius [[Phil. Trans. R. Soc. A 375, 20150440 \(2017\)](#)]. As a result it is possible for core light to phase-match to cladding modes, causing a series of deep transmission dips at certain wavelengths [[Science 337, 446 \(2012\)](#)]. This effect can be used in angle sensing [[Xi et al: Opt. Lett. 38, 5401 \(2013\)](#)]. In a twisted PCF with N solid cores placed in a ring around the fibre axis [[Optica 1, 165 \(2014\)](#)], inter-core coupling gives rise to helical Bloch modes (HBMs) that propagate around the ring. HBMs with equal and opposite signs of ℓ_0 have modal indices that differ in proportion to the twist rate, as well as exhibiting strong circular birefringence. Twisting the periodically structured “space” within a coreless PCF creates a helical channel where guided modes can form despite the absence of any discernible core structure [[Science Advances 2, e1601421 \(2016\)](#)]. Hollow core “single-ring” PCF, consisting of a ring of thin-walled capillaries mounted inside a thick-walled capillary fibre, exhibits strong circular dichroism when twisted, even though neither glass nor air is circularly dichroic [[Optica 5, 1315 \(2018\)](#)].

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