Programme of the 1st Transnational Round Table on Magnonics, High-Frequency Spintronics, and Ultrafast Magnetism (TRTM'2024), Exeter, 3 – 7 June 2024

	Monday, 3 June	Tuesday, 4 June	Wednesday, 5 June	Thursday, 6 June	Friday, 7 June
8:30	Arrivals	Coffee from 8:45	Coffee from 8:45	Coffee from 8:45	Coffee from 8:45
9:00		**Breakfast discussion** Magnonics, spintronics, and ultrafast magnetism for edge computing	**Breakfast discussion** MaxLLG: Introduction	**Breakfast discussion** TRTM's format: First lessons and next steps	**Breakfast discussion** THz magnonics: Ways forward
9:30	Arrivals, registration, and welcome coffee		**Amir Capua** Spin torque driven skyrmion resonance technique in magnetic bulk crystals		
10:00		**Susmita Saha** Tunable spin wave dynamics in two-dimensional deterministic magnonic fractals		**Oksana Chubykalo-Fesenko** Ultrafast switching and domain wall dynamics in Mn_2Au by novel laser-induced torques	**Thomas Thomson** Magnetisation dynamics of magnetically coupled multilayer thin films
10:30	Arrivals, registration, collaboration, and welcome coffee / Group lab tour 1		**Andrei Kirilyuk** Ultrafast magnetization reversal by excitation at the frequencies of optical phonons		
11:00		**Jaroslaw Kłos** Unconventional spin wave localization in magnonic nanostructures of long-range order		**Pranaba Muduli** Controlling ultrafast terahertz dynamics through crystalline orientation in antiferromagnetic hematite	**Andrey Shytov** Chiral resonant scattering of spin waves in magnetostatically coupled systems
11:30	Group lab tour 2		Light lunch		
12:00		Buffet lunch	Excursion bus departure at 12:15	Buffet lunch	Awards, feedback, and conference closing
12:30	Time for putting posters on		Bus travel to Tintagel		Buffet lunch
13:00	Buffet lunch	**Matteo Vitali** Magnetic nanopatterning of YIG films via direct laser writing for magnonics		**Maciej Dąbrowski** All-optical control of spins in van der Waals magnets	MaxLLG practice, collaboration and networking, additional lab tours / Departures
13:30					
14:00	Conference opening	**Huixin Guo** Realization and control of bulk and surface modes in 3D nanomagnonic networks by additive manufacturing of ferromagnets	Tintagel Castle visit	**Sergii Parchenko** Magnetization dynamics after non-collinear dual optical excitation	
14:30	**Denis Candido** Hybrid magnonics as a unique platform for spin centre-based quantum technologies				
15:00		Coffee break		Coffee break	Coffee break
15:30	Coffee break	**Pieter Gunnink** Accessing topological magnonic excitations in non-equilibrium	Bus departure at 16:15 and travel to Camelot Castle	MaxLLG seminar / Collaboration and networking	MaxLLG practice, collaboration and networking
16:00	**Tom Hayward** Integrated magnonic reservoir computing with magnetic metamaterials				
16:30		**2 min poster pitches**	Afternoon tea at Camelot Castle		Informal walking tour around Exeter and local pub visit*
17:00	**Kirill Rivkin** Spin wave computing and mode engineering using hard media bias field				
17:30		Posters and refreshments		Drinks reception and posters	
18:00	Welcome reception		Photos		
18:30			Bus departure at 18:30	Conference dinner (until about 21:00)	
19:00			Travel to Exeter (stopping at Rougemont and then Reed Hall)		
19:30					

* Informal dinner at a local venue will also be organised at about 6-7pm on Sunday, 2 June for those arriving to Exeter early enough on the day.

Unconventional spin wave localization in magnonic nanostructures of long-range order

(in-depth report)

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Defects introduced into systems with long-range order, such as periodic or quasiperiodic lattices, can induce localized states of energies (frequencies) from usually forbidden gaps for propagating waves. This effect is also present in spin waves found in magnonic crystals or quasicrystals.

Identifying defects that involve rearrangement of building blocks in the crystals is comparatively easy. However, it is more difficult to systematically introduce defects into quasicrystals. Another challenge of studying defects in quasicrystals is the localization of bulk states that occurs even in the absence of defects. To analyze the impact of such defects, one possibility is to introduce so-called phonic defects, which are related to the perturbation of the structural degrees of freedom in quasicrystals - i.e. phasons.

Another unusual type of localization, counterintuitively observed despite the absence of defects in the crystal lattice, is associated with the existence of flat bands in the dispersion relation. This type of localized state, called compact localized states, is observed in bipartite lattices.

Firstly, we will discuss the conventional mechanism of spin-wave localization in magnonic crystals, which is related to the disruption of periodicity in these systems. Then we introduce the concept of phasonic defects in planar magnonic quasicrystal-perturbed Fibonacci sequences of flat stripes [1]. Subsequently, we present the compact localized states in a planar magnonic Lieb lattice [2].

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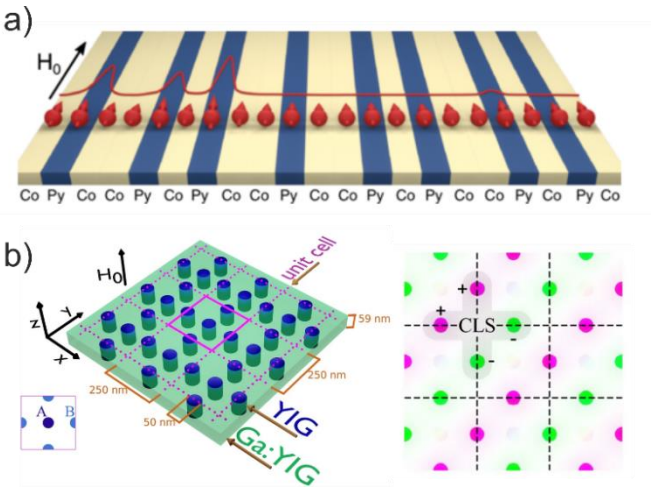

Fig. 1. The approximate of a Fibonacci quasicrystal resulting from the standard substitution rules. The structure is composed of Py and Co flat strips (30 nm thick and 300 nm wide), aligned side-by-side and being in direct contact. The field 0.1 T is applied along the strips. The sequence of tilted arrows and line in front of them visualizes the spin-wave mode profile. (b) Left: Magnonic Lieb lattice consists of YIG cylindrical nanoelements embedded within Ga:YIG matrix. The unit cell contains three inclusions of 50 nm. The separation between centers of inclusions is equal to 125 nm. Right: The profiles of the Bloch functions obtained for the basic Lieb lattice. The patterns characteristic for compact localized states (CLS) are presented at the point M for the second band. The CLS do not occupy minority sublattice A.

[1] S. Mieszczak, M. Krawczyk, J. W. Kłos, *Spin-wave localization on phasonic defects in a one-dimensional magnonic quasicrystal*, Phys. Rev. B **106**, 064430 (2022).

[2] G. Centała, J. W. Kłos, *Compact localized states in magnonic Lieb lattices*, Sci. Rep. 13, 12676 (2023).