

PHYS-726

**Introduction to Frustrated Magnetism**

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<b>Cursus</b>	<b>Sem.</b>	<b>Type</b>
Physics		Opt.

Language of teaching	English
Credits	2
Session	
Exam	Oral
Workload	60h
<b>Hours</b>	<b>28</b>
Courses	28
<b>Number of positions</b>	<b>30</b>

**Frequency**

Every 3 years

**Remark**

Next time: Fall 2022

**Summary**

To provide an introduction to all aspects of the rapidly evolving field of frustrated magnetism: 1) New paradigms: spin liquids, spin ice, topological order, ... 2) Basic models and methods 3) Experimental realizations

**Content**

- 1) Introduction: definition and overview of frustration in magnetism
- 2) Basic models
- 3) Classical frustrated magnets: ground state degeneracy and ground state correlations
- 4) Order by disorder: ordering by thermal or quantum fluctuations
- 5) Spontaneous breaking of translational symmetry: valence-bond solids, magnetization plateaux
- 6) Broken SU(2) symmetry without magnetic order: nematic order
- 7) Spin liquids: Resonating-Valence Bond liquids, algebraic order, topological order
- 8) Conclusion: open issues and perspectives

**Keywords**

Solid state physics, quantum magnetism, frustration, quantum phase transitions

**Learning Prerequisites****Required courses**

Basic courses of quantum mechanics, statistical physics and solid state physics

**Learning Outcomes**

By the end of the course, the student must be able to:

- Carry out research dealing with frustrated magnetism.