Introduction to Frustrated Magnetism

Mila Frédéric

**Cursus**  
Physique

<table>
<thead>
<tr>
<th>Language</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credits</td>
<td>2</td>
</tr>
<tr>
<td>Session</td>
<td>Oral</td>
</tr>
<tr>
<td>Exam</td>
<td></td>
</tr>
<tr>
<td>Workload</td>
<td>60h</td>
</tr>
<tr>
<td>Hours</td>
<td>28</td>
</tr>
<tr>
<td>Lecture</td>
<td>28</td>
</tr>
<tr>
<td>Number of positions</td>
<td>30</td>
</tr>
</tbody>
</table>

**Frequency**  
Every 3 years

**Remarque**  
Next time: Fall 2019

**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.