



---

Seminar:	<b>Classical Solutions in Gauge Theory</b>
Dozentin:	<b>Dr. Mara Ungureanu (Math. Institut)</b>
Dozent:	<b>Prof. Dr. Jochum van der Bij (Physik. Institut)</b>
Zeit/Ort:	<b>Do 14–16 Uhr, HS II, Albertstr. 23b und bbb-Raum Euwe</b>
Tutorium:	<b>Dr. Mara Ungureanu</b>
Vorbesprechung:	<b>22. Juli 2021, 14–16 Uhr</b> im virtuellen <b>bbb-Raum Euwe</b> . Bei Interesse bitte Voranmeldung bis 20. Juli 2021 per e-Mail an <b><a href="mailto:mara.ungureanu@math.uni-freiburg.de">mara.ungureanu@math.uni-freiburg.de</a></b>
Web-Seite:	<b><a href="https://home.mathematik.uni-freiburg.de/mathphys/lehre/WiSe21/gaugetheory.html">https://home.mathematik.uni-freiburg.de/mathphys/lehre/ WiSe21/gaugetheory.html</a></b>

---

### **Inhalt:**

The goal of this seminar is to explore both mathematical and physical aspects of gauge theories. As field theories combining both quantum mechanics and Einstein's theory of special relativity, gauge theories play an important role in modern physics and mathematics.

Using geometric concepts such as principle bundles, Lie groups, and Lie algebras we shall describe various solutions to the equations of motion of Yang-Mills gauge theories, including monopoles and instantons, and explore the concept of symmetry breaking which gives rise to the Higgs mechanism.

This seminar is run jointly by the Freiburg Mathematics and Physics departments. The talks are aimed at a mixed audience of mathematics and physics students, with the aim of bridging the language gap between the two approaches to gauge theories.

For physics students it is recommended to follow the General Relativity lecture in parallel.

### **Literatur:**

- 1.) J. Baez, J.P. Muniain, Gauge Fields, Knots and Gravity, World Scientific, 1994
- 2.) C. Nash, S. Sen, Topology and Geometry for Physicists, Academic Press, 1983

---

Notwendige Vorkenntnisse:	Mathematikstudierenden: Vorlesung Differentialgeometrie I Physikstudierenden: Elektromagnetismus, spezielle Relativitätstheorie, Quantenmechanik
---------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------