Module:	**Elective Advanced Lectures: Theoretical Physics**
Module No.: physics70c	

Course: universität**bonn**   **Machine Learning for Quantum Scientists (T)**

Course No.: physics7516

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture with exercises	English	2+2	5	WT/ST

Requirements for Participation:

Preparation:
Theoretical courses at the Bachelor degree level

Form of Testing and Examination:
Written / oral examination

Length of Course:
1 semester

Aims of the Course:
Understanding the basics of machine learning and applications in quantum sciences

Contents of the Course:
- Basic structure, training, and analysis of artificial neural networks
- Standard architectures for machine learning, including convolutional neural networks, Boltzmann machines, and deep generative models
- Applications of machine learning in theoretical physics and chemistry

Recommended Literature:
C. M. Bishop, "Pattern Recognition and Machine Learning", Springer.
I. Goodfellow, Y. Bengio, A. Courville, "Deep Learning", MIT Press.
A. Dawid, et al., "Modern Applications of Machine Learning in Quantum Sciences", Cambridge University Press

within the Transdisciplinary Research Area "Building Blocks of Matter and Fundamental Interactions"