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## Colloquium of the research platform MMM, jointly with Meteorological-Geophysical Colloquium

The [Wolfgang Pauli Institute Vienna](#), jointly with  
the [research platform MMM „Mathematics-Magnetism-Materials”](#) and the  
[Faculty for Earth Sciences, Geography and Astronomy Universität Wien](#)

kindly invite you to the talk of **Rupert KLEIN** (Freie Univ. Berlin & WPI)

**Time: Thursday, 5. Dez. 2024, 16h45 – 18:00**

**Place: Room 2B204 ”Eberhard Clar Saal”, ground floor (Ebene E2) UZA II,  
“Geozentrum”, Josef-Holaubek Platz 2, 1090 Wien**

**Online via zoom-link:**

<https://univienne.zoom.us/j/66942796112?pwd=MnhJZEplYWVXUHlyM1NDR01UTGZ4QT09>

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1) **16h45: *Welcome & Introduction*** : Norbert J Mauser & Andreas Stohl (U.Wien)

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2) **16h55 – 17h45 : **Rupert Klein**** (FU Berlin):

**«*Machine Learning and Math Modelling:  
how Weather & Climate Science stand to gain*»**



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**Abstract:** This presentation will explain by way of examples how data-based machine learning and physics-based mathematical modelling may contribute valuable complementary skills and insights to weather and climate science. Judicious combinations of both promise further progress. However, there are serious potential pitfalls and caveats. The examples involve many-month El Niño prediction, mechanisms for the spin-up of tropical cyclones, and more.

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3) **17h55 – 19h: “open discussions”** with drinks & sandwiches, in front of the lecture room  
(next to the dinosaur)

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*Norbert J Mauser*  
(director WPI &  
head [research platform MMM](#))

*Andreas Stohl*  
(vice dean of research Fak. Geo – Astro &  
head [institute of meteorology](#))

## **Short Biography:**

**Rupert Klein** received his doctorate in 1988 in mechanical engineering at RWTH Aachen University and then spent two years as a postdoc with [Andrew Majda](#) in Princeton. After his habilitation back in Aachen in 1995 he was professor for Safety Technology at the Bergische Universität Wuppertal before accepting a chair in Scientific Computing at Freie Universität (FU) Berlin in 1997, with a focus on geophysical fluid dynamics.

From 1997 to 2007 he headed the Data & Computation department at the [PIK, the Potsdam-Institute for Climate Impact Research](#), where he also served as the deputy director in 2006/07.

In his research he develops and employs techniques of asymptotic analysis and numerics for multi-scale dynamics to improve our understanding of a broad range of application problems. Besides the geophysical fluid dynamics of weather and climate, these include, e.g., the reactive gas dynamics of pressure-gain combustion for gas turbines and electronic structure problems associated with solar energy conversion.

His department's research at the Potsdam Institute led to the mathematical formalization of otherwise rather ambiguous natural language concepts such as "vulnerability" or "resilience", which are widely used in climate impact studies.

In 2003 he received the Leibniz award, the German equivalent to the Austrian Wittgenstein award, and in 2005 he became a member of the Berlin-Brandenburgischen Akademie der Wissenschaften. Other awards Rupert Klein received include two 3-year fellowships (2014, 2017) of the European Centre for Medium Range Weather Forecasts (ECMWF), Reading, UK.

He is currently a PI in the DFG [Research group FOR 5528 "CIAO"](#), a PI in the DFG collaborative research centre [SFB 1114 "Scaling Cascades in Complex Systems"](#) and a "Pauli Fellow" in the [WPI Thematic Program "Models in Plasmas, Earth and Space Sciences"](#).