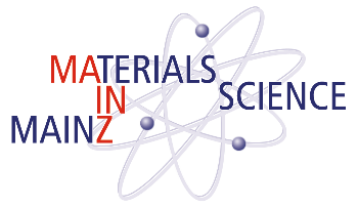




PRISMA+



Physics Colloquium Mainz

Tuesday, 17 December 2019

Institute for Nuclear Physics
Lecture Hall
Johann-J.-Becher-Weg 45

4.15pm Tea from 3.45pm

Professor Los Lelieveld
Max Planck Institute for Chemistry
Mainz



Impacts of anthropogenic emissions on public health, rainfall and climate

Anthropogenic greenhouse gases and aerosols are associated with climate change and human health risks. We used a global model to estimate both the climate and public health outcomes attributable to fossil fuel use, indicating the potential benefits of a phase out. We show how much excess mortality from outdoor air pollution can be avoided worldwide. Because aerosols affect the hydrologic cycle, removing the anthropogenic emissions in the model significantly increase rainfall over densely populated regions in India, northern China, Central America, West Africa and the drought-prone Sahel, thus contributing to water and food security. Since aerosols mask the anthropogenic rise in global temperature, removing fossil fuel generated particles liberates about 0.5°C (global mean), up to 2°C over North America and Northeast Asia. The steep global temperature increase from removing aerosols can be moderated to about 0.35°C by the simultaneous reduction of tropospheric ozone and methane. We conclude that a rapid phase-out of fossil fuel related emissions and major reductions of other anthropogenic sources are needed to save millions of lives, restore aerosol-perturbed rainfall patterns, and limit global warming to 2°C.

Lelieveld, J., K. Klingmüller, A. Pozzer, R.T. Burnett, A. Haines and V. Ramanathan (2019) Effects of fossil fuel and total anthropogenic emission removal on public health and climate. Proc. Natl. Acad. Sci. U.S.A. 116, 7192-7197.