

# Seminar

über

## **Demographics and physics of BH growth and AGN-driven outflows in cosmological simulations**

We present new insights from modern cosmological simulations indicating a complex interplay between the central accreting BH and its host galaxy. Large-scale simulations are successful in producing realistic global BH and AGN populations e.g. capturing the observed anti-hierarchical trend in BH growth. For that, both stellar and AGN feedback can play an important role for the gas accretion onto low-mass and massive BHs, respectively. Employing advanced high-resolution zoom-in simulations, we confirm and extend earlier results that AGN feedback can in turn also strongly affect the BH's host galaxy. Specifically, our momentum and energy-conserving kinetic AGN feedback model can drive powerful, galactic outflows, not only ejecting gas from galaxies and their halos, but simultaneously strongly suppressing inflow of new gas. Both ejective and preventive feedback modes significantly reduce insitu star formation below  $z \sim 3$  resulting in more realistic masses, structural, kinematic and stellar population properties of the model galaxies than without AGN feedback, consistent with observations at various redshifts. We highlight that AGN feedback has a significant impact on the chemical enrichment of the CGM around massive galaxies. Both the hot and warm gas-phase metallicities in the CGM increase significantly out to large radii ( $\sim 250\text{kpc}$ ) at low redshifts — much closer to observations than without AGN feedback. Finally, successes and limitations of most recent models and perspectives for future improvements will be given.

von

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**Montag, 22. Mai 2017, um 15:00 Uhr im HS**

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