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Venue: Telescopium – old Auditorium

Title: Atmospheric turbulence and resolution of ground-based telescopes

Abstract:
A broad range of topics related to seeing will be reviewed. I start by recalling the success and limitations of the turbulence theory allowing to measure seeing with small telescopes and to characterize it by one or two parameters, r0 and L0. Comparison of seeing measured by DIMMs with the actual delivered image quality (DIQ) shows discrepancies of both signs. The DIQ is better than the seeing if the outer scale is not accounted for and when the DIMM is affected by the local turbulence in its vicinity, meaning that the DIMM seeing is always an upper limit, while the MASS instrument measuring the free-atmosphere seeing gives the lower limit. Indeed, the turbulence in the surface layer can be unexpectedly weak at Paranal and at other observatories. The DIQ becomes worse than the seeing when telescopes are affected by turbulence in the domes and on the mirrors. Current approaches to quantifying the dome seeing will be reviewed. Partial improvement of seeing is implemented in the SAM AO instrument. Non-trivial effects of the dome seeing such as Mickey ears and ghosts still lack understanding.