

- **Evolving apparent horizons in the McVittie spacetime**  
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The McVittie spacetime of General Relativity, which contains evolving cosmological and black hole apparent horizons, is studied on the model of one of its special cases: the Schwarzschild-de Sitter/Kottler spacetime. By plotting the areal radii of the apparent horizons versus comoving time and assuming a dust-dominated universe, we find that a pair of apparent horizons are created after a critical time. A cosmological horizon grows with time while a black hole horizon asymptotes to an areal radius corresponding to a singularity at a value of  $2m$ . The relationship between the areas of the horizons and entropy is discussed, as well as the solution for a phantom-dominated “background” universe.