

Foliation dependence of black hole dynamical horizons in Vaidya spacetimes

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Trapping horizons - motivation

- **Numerical Relativity**

Extract data from numerical simulations such as black hole mass, angular momentum and multipole moments

- **Geometric Analysis**

Solutions of Jang's equation, positivity of mass, Penrose inequality.

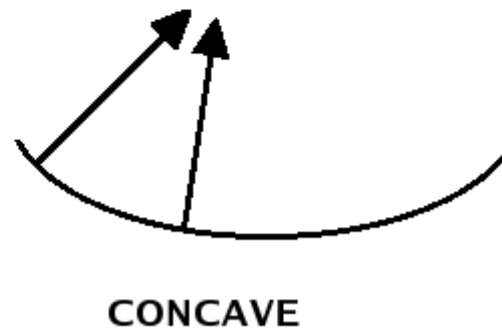
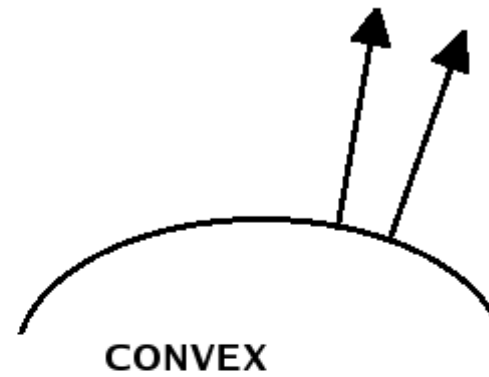
- **Quantum Gravity**

Gravitational field interaction with quantum fields – thermodynamics, Hawking radiation, quantum state evolution

- **Experimental Analogue Gravity**

Acoustic horizons in fluids, liquid helium and BECs

Light focusing



Definitions

- **Numerical Relativists**

$$\nabla_i s^i + K_{ij} s^i s^j - K = 0$$

- **Geometers**

$$P + H = 0$$

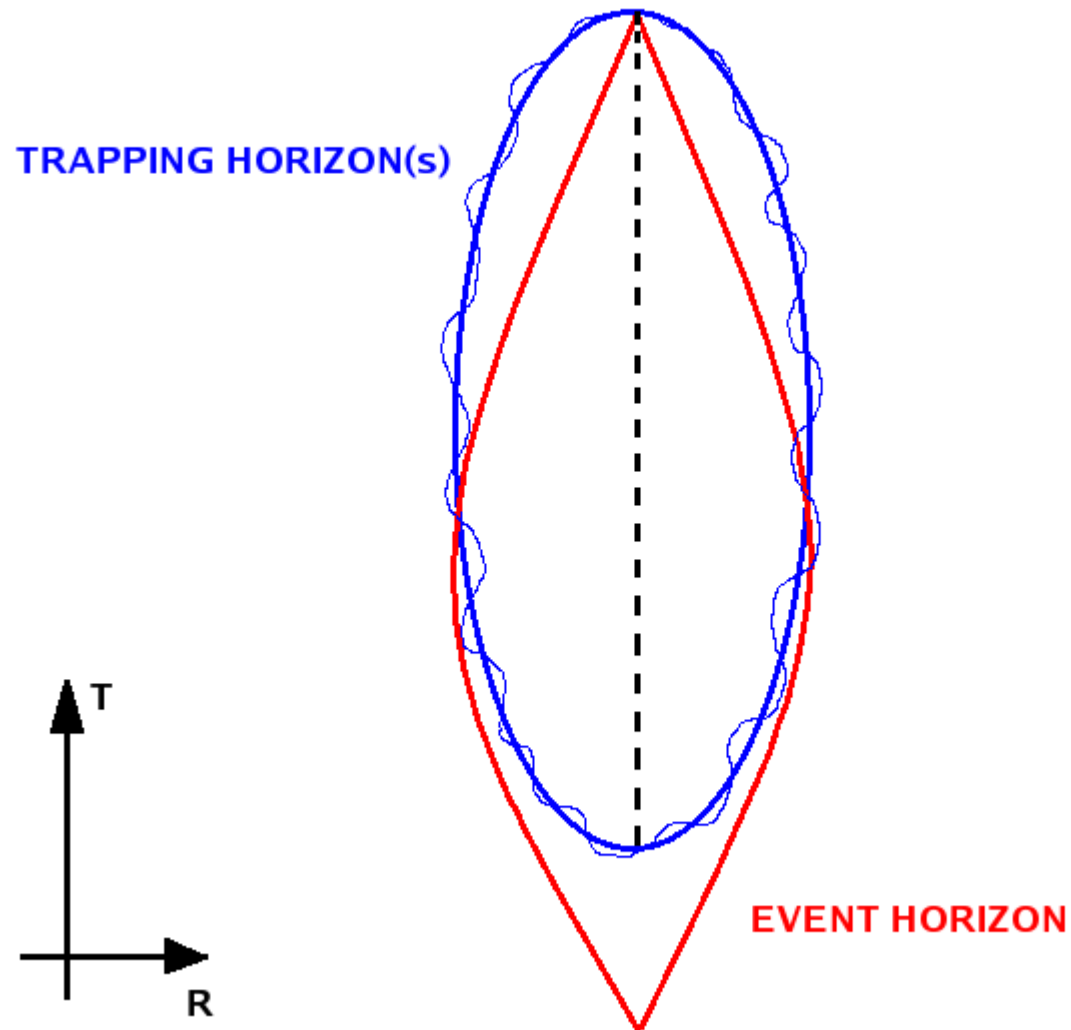
- **Theorists**

$$h^{\hat{a}b} \hat{B}_{ab} = 0$$

- **Experimentalists**

$$v_s - v_f = 0$$

Pictorially



Dynamical Evolution

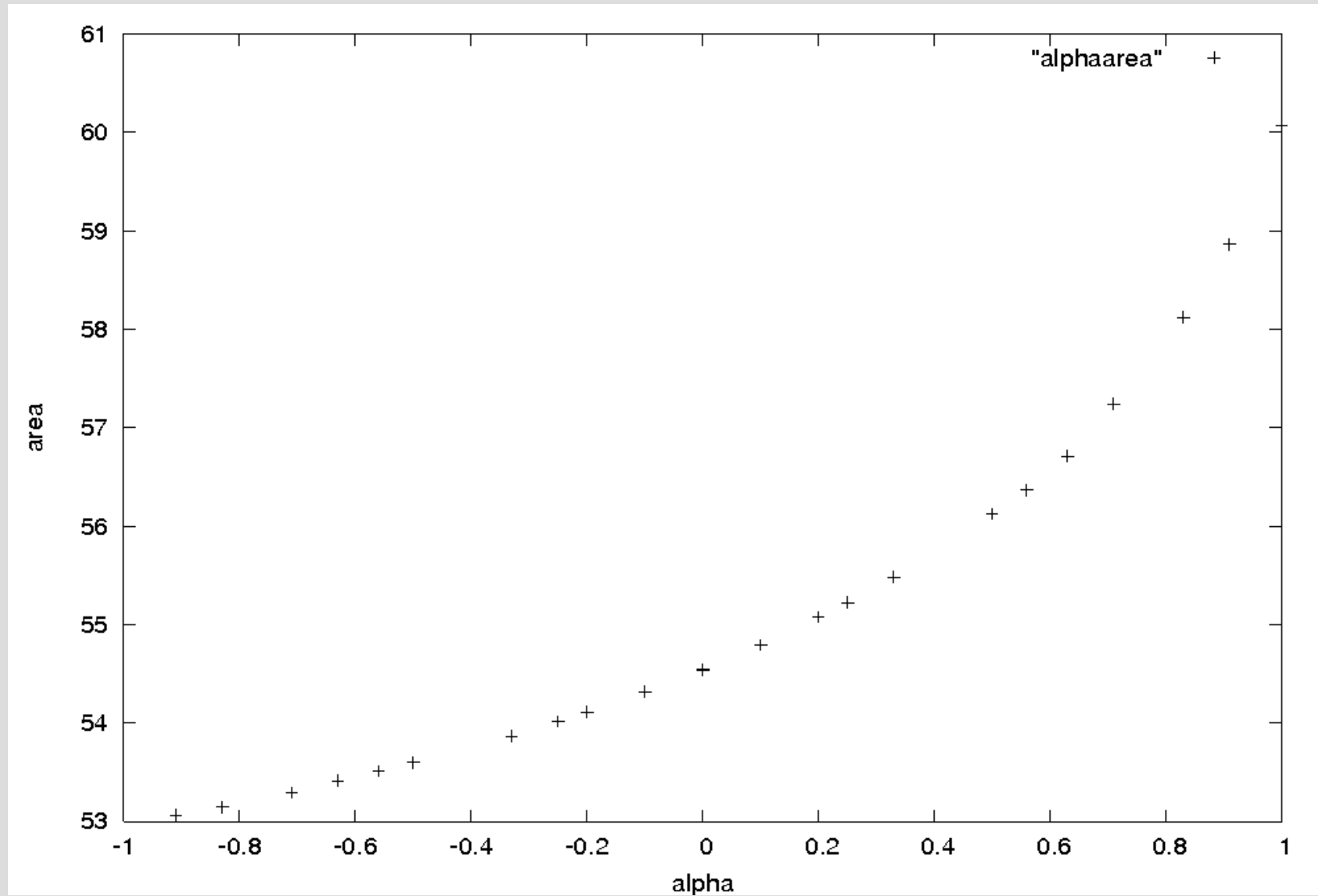
$$ds^2 = - \Delta (v, r) dv^2 + 2 dvdr + r^2 d\Omega^2$$

$$\Delta (v, r) = 1 - 2m(v)/r$$

$$m(v) = M + \dot{m}v$$

$$\bar{t} = v - r - \alpha r \cos \theta$$

Area vs alpha



Area vs mass_dot

