

Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Method to compute the stress-energy tensor of a scalar field outside of a Schwarzschild black hole that forms from the collapse of null shell.¹ SHOHREH GHOLIZADEH SIAHMAZGI, PAUL R. ANDERSON, RAYMOND D. CLARK, Wake Forest Univ, ALESSANDRO FABBRI, Universidad de Valencia — A method will be discussed which allows for the numerical computation of the semi-classical stress-energy tensor, $\langle in|T_{\mu\nu}|in\rangle$, associated with a quantized massless minimally coupled scalar field in the region outside the event horizon of a (3+1)D Schwarzschild black hole that forms from the collapse of a null shell. This method is based on the idea that one can expand the in-modes in terms of a complete set of solutions to the mode equation in the exact Schwarzschild geometry. Applying this method, a full numerical computation of the renormalized stress-energy tensor for the (1+1)D case is done and shown to be equal to the known solution. In (3+1)D, the presence of an effective potential in the mode equation causes scattering effects that make the matching more difficult. Tests that check the validity of the 4D matching method will be discussed.

¹This work was supported in part by the National Science Foundation under Grants No. PHY-1308325, PHY-1505875, and PHY-1912584 to Wake Forest University.

Shohreh Gholizadeh Siahmazgi
Wake Forest Univ

Date submitted: 02 Jan 2020

Electronic form version 1.4