

Abstract Submitted  
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**Predicting the final spin of the black hole mergers<sup>1</sup>** PETR TSATSIN, WOLFGANG TICHY, Florida Atlantic University — We consider black holes resulting from binary black hole mergers. Analytical formulas predicting the mass and spin of the final merged black hole have previously been obtained by fitting data from numerical simulations (Phys.Rev. D, 78, 081501). However, since these simulations all started from small initial separations (initial angular velocity  $\omega = 0.05/m$ ), these formulas are inaccurate for large initial separations. To find more accurate results for larger initial separations, we use Post-Newtonian equations to evolve the binary system from any large separation to the separation where  $\omega = 0.05/m$  and then apply the analytical formulas. Using this combined approach we show that the magnitude of the final spin depends only weakly on the initial separation and the accuracy of the prediction for the direction of the final spin significantly improves. Other modeling formulas known in the literature give only the polar angle of the final spin direction. Our approach gives both polar and azimuth angle. We find that the azimuth strongly depends on the initial separation.

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