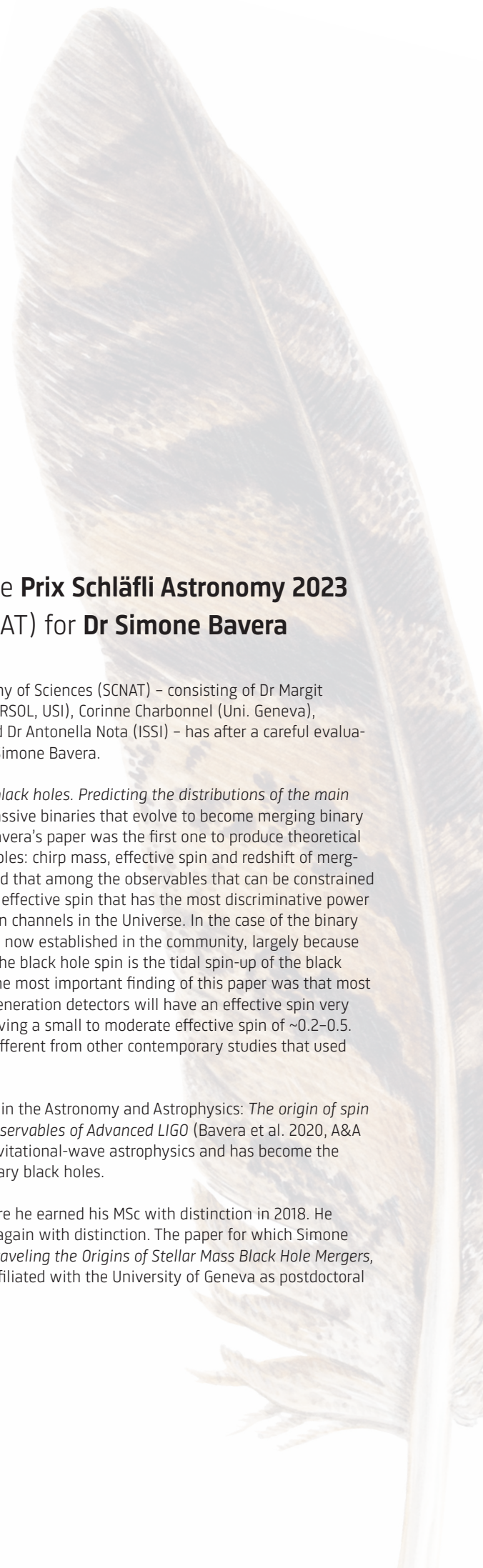




Prix Schläfli

Astronomy 2023



Laudatio for the Award Ceremony of the **Prix Schläfli Astronomy 2023** of the Swiss Academy of Sciences (SCNAT) for **Dr Simone Bavera**

The Jury of the Prix Schläfli Astronomy 2023 of the Swiss Academy of Sciences (SCNAT) – consisting of Dr Margit Haberreiter (PMOD/WRC), and Professors Svetlana Berdyugina (IRSOL, USI), Corinne Charbonnel (Uni. Geneva), Philippe Jetzer (Uni. Zürich), Christoph Mordasini (Uni. Bern), and Dr Antonella Nota (ISSI) – has after a careful evaluation decided to award the Prix Schläfli 2023 in Astronomy to Dr Simone Bavera.

Dr Bavera's highly successful work, *The origin of spin in binary black holes. Predicting the distributions of the main observables of Advanced LIGO*, is related to the population of massive binaries that evolve to become merging binary black holes through the isolated binary evolutionary channel. Bavera's paper was the first one to produce theoretical predictions about the combined distribution of all three observables: chirp mass, effective spin and redshift of mergers, measured with gravitational waves. Simone early on realised that among the observables that can be constrained by current generation gravitational wave observatories, it is the effective spin that has the most discriminative power in differentiating among the multiple binary black hole formation channels in the Universe. In the case of the binary black holes resulting from the evolution of isolated binaries, it is now established in the community, largely because of Dr Bavera's paper, that the physical process that determines the black hole spin is the tidal spin-up of the black hole's immediate progenitor, a stripped helium star. Above all, the most important finding of this paper was that most of the observable coalescing binary black holes by the current generation detectors will have an effective spin very close to zero, with a smaller percentage of 10–20% of events having a small to moderate effective spin of ~ 0.2 – 0.5 . These predictions are not only quantitatively but qualitatively different from other contemporary studies that used approximate semi-analytical methods.

Dr Bavera and his colleagues published this breakthrough result in the *Astronomy and Astrophysics: The origin of spin in binary black holes. Predicting the distributions of the main observables of Advanced LIGO* (Bavera et al. 2020, A&A 635, A97). This paper has already been broadly influential in gravitational-wave astrophysics and has become the standard reference regarding the origin of spin in coalescing binary black holes.

Dr Bavera studied physics and astronomy at the ETH Zürich where he earned his MSc with distinction in 2018. He further received his PhD from the University of Geneva in 2022, again with distinction. The paper for which Simone Bavera is awarded the Prix Schläfli is part of his dissertation *Unraveling the Origins of Stellar Mass Black Hole Mergers*, supervised by Prof. Anastasios Fragkos. Dr Bavera is currently affiliated with the University of Geneva as postdoctoral researcher.

Geneva, 5–6 October 2023

Dr Margit Haberreiter, President Jury