

of Cepheids to improving the accuracy of Cepheid-related distance measurements. Specifically, I collaborated with Adam and Stefano to quantify parallax errors due to orbital motion and bias produced by stars physically associated with Cepheids.

Meanwhile, the SHOES team significantly improved the accuracy of the extragalactic distance ladder and established an intriguing discord between late- and early-Universe values of Hubble's constant,  $H_0$ . This so-called "Hubble tension" — which now figures at a significance of  $4.4\sigma$  — leads to the exciting possibility of

an imminent breakthrough in fundamental physics, as the difference between late- and early-Universe  $H_0$  values suggests that the  $\Lambda$ CDM Concordance Cosmological Model may be incomplete. However, before new physics can be credibly invoked to resolve the Hubble tension, known and unknown error sources must be critically assessed and further reduced, and independent, high-accuracy (1–2%)  $H_0$  measurements pursued.

I am highly motivated to further elucidate the Hubble tension via my experience in the stellar astrophysics of Cepheids

and the calibration of the cosmic distance ladder, and to this end I am currently working with Martino Romaniello and PhD candidate Sara Mancino to characterise the effect of chemical composition on Cepheids and the Leavitt law. Mentoring and advising graduate students has been a particularly rewarding experience for me, and I look forward to leading a research group of my own because this will allow me to continue pursuing my research ideas while improving the chances of contributing to a major breakthrough. In any case, I will surely have a blast trying!

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## Gustav Andreas Tammann (1932–2019)

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Gustav Andreas Tammann died in January 2019, after a long and successful astronomical career. He made seminal contributions to extragalactic astrophysics and cosmology and is best known for his work to determine the Hubble constant and the use of supernovae as cosmic distance indicators. For many years he was the leading extragalactic astronomer in Europe. Tammann also had a long association with ESO and was instrumental in convincing the Swiss government to join the Organisation in 1982.

After a degree from the University of Basel, Switzerland, Tammann spent time as a Research Associate at the Mount Wilson and Palomar Observatories in Pasadena, California. After his return to Europe he first held a professorship in Hamburg, and was then Director of the Astronomical Institute in Basel from 1977 until his retirement in 2002.

While in Pasadena, Tammann and Allan Sandage initiated a research programme resulting in a collaboration lasting over four decades, aimed at establishing the distance ladder and ultimately measuring

the value of the Hubble constant. They carefully investigated every rung of the distance ladder until they reached distances in the Hubble flow to establish the current cosmic expansion rate. Tammann strongly advocated the use of supernovae as distance indicators and in other cosmological applications, for example, using time dilation to test general relativity. He was vindicated by the successful use of Type Ia supernovae to provide a reliable last rung into the Hubble flow, and ultimately to produce evidence for accelerated cosmic expansion. The exact value of the Hubble constant remains a matter of intense debate, but the local expansion rate is now almost exclusively measured by Type Ia supernovae (calibrated by Cepheid stars), the most accurate distance indicator available for cosmology to date.

Tammann received many distinctions, including the Karl-Schwarzschild Medaille of the Astronomische Gesellschaft, the Albert-Einstein-Medaille of the Einstein Gesellschaft Bern and the Tomalla-Preis by the Tomalla Foundation. He served as president of the Astronomische Gesellschaft from 1981 to 1984 and was an elected member of several academies.

Gustav Tammann had a close association with ESO for nearly 40 years. He was an ESO research associate from 1975

until 1993 (together with Philippe Véron, Franco Pacini and Jean-Pierre Swings), supported the then Director General Lodewijk Woltjer in scientific matters and helped build a science group at ESO headquarters. He worked with the Swiss government to enable the accession of Switzerland to ESO as the seventh Member State and served as the Swiss representative on the ESO Council from 1992 until 2002.

