1996RMxAC...5..129K

*RevMexAA (Serie de Conferencias)*, **5**, 129–130 (1996)

# CONCLUDING REMARKS

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The title of this workshop "Colliding Winds in Binary Stars" is very appropriate to honor Jorge Sahade. He was one of the astronomers who truly pioneered the field —with people like Otto Struve and Gerard Kuiper. The remarkable thing here is that Jorge Sahade still is a pioneer in this field. Of course, in comparison to the age of the solar system —about which most astronomers can agree (although they do not seem to agree about the age of the universe)— he is quite young. Perhaps, that is the secret of his vigor. He lives by cosmic standards.

His distinguished career as a researcher and a statesman of science is on public record. Just to mention a few examples, he served as vice president and president of the International Astronomical Union, and served till 1994 as president of the Argentinean Commission on Space.

Tony Moffat gave a good summary of the poster papers. A number of outstanding observational and theoretical reports have been presented orally over the past four days. However, instead of giving a four-hour review of all invited talks as I originally planned, I will present a brief perspective of what has transpired at this workshop. (Those who wish to hear the four-hour version, are kindly invited to join me on my nine-hour flight from Buenos Aires to Miami. We will have plenty of time for it while in flight.)

At this workshop we have seen that multiwavelength observations from ground and space have come to play clearly an important role in binary star research. We started with the visible light and have expanded our domain to the ultraviolet, x-ray, gamma-ray, infrared and radio frequencies. Earlier, we were like a blind person trying to figure out what an elephant looked like by touching just a part of its body, be it its tail, trunk or ear. Now we are finally beginning to see the whole picture, although still through a glass somewhat darkly.

One of the most exciting reports at this meeting was given by Doug Gies, who described the plans for one-meter aperture interferometric telescopes that are to be located 350 meters apart atop Mount Wilson. Corrections for the atmospheric disturbances will present pesky problems but, as Doug pointed out, they are in principle solvable. At this separation, we should be able to attain an angular resolution of almost 10E-9 radian in the visible light. At a distance of 100 light years, it will correspond to a resolution of some one solar diameter.

At NASA we will soon be testing an interferometric technology for free-flying satellites. In order for this technology to work, we need to know the relative positions of the satellite telescopes within some tens of Angstroms for the visible light. When this technology is perfected, we can have any length of base-line we want for interferometry, which will mean virtually unlimited resolution. We currently have a plan to test a pair of interferometric telescopes in orbit in the year 2000. Of course, in space, we need not worry about atmospheric corrections.

Even before the availability of this new interferometric technology for orbiting telescopes, the Moon provides an excellent site for interferometry as it provides a solid base for the telescopes. At a separation of 350 kilometers, easily attainable on the Moon, we can improve the resolution of the Mount Wilson telescopes by a thousand times. A resolving power of 10E-12 radian means that a tenth of the solar diameter can be resolved at a distance of 10,000 light years in visible light. At such resolutions, we can really observe what any binary system really looks like, replete with gas streams and amorphous accretion clouds. We will be needing greater light collecting areas as we extend our reach to fainter stars; a multiple mirror system of the sort that Doug Gies talked about can address that problem efficiently.

A person from Missouri in the USA will say "Show me!", if anyone makes assertions about something that the Missourian has not yet seen. With the aid of interferometric telescopes, we will soon have models for interacting binaries that can satisfy even astronomers from Missouri.

I would venture to suggest that Sahade's published works will remain essentially valid even when interferometry begins to reveal the true picture of close binaries. He has always delineated observational facts



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from assumptions —clearly. He has done so whether the assumptions are his own or those made by others. Hence, his models have always been closely tied to what has been observed —rather than to someone's figment of imagination. He has had the gift of physical insight and is consequently capable of seeing the essentials and can tell the significant from the trivial. I am not aware of a single instance where he had to retract his statements on a major issue.

A good example of his uncanny insight was his paper on R Arae published in 1952, in which he suggested that the binary was similar to $\beta$ Lyrae. Recent observations, especially ultraviolet observations show clearly that it is indeed the case. No other binary resembles $\beta$ Lyrae like R Arae. This is true despite various papers on $\beta$ Lyrae —including some very recent reports— making its putative properties appear analogous to other objects with 'fashionable' models —the models that are based purely on speculations.

I hope that I will be able to make it to a workshop to honor Jorge's one hundredth birthday. I would not be surprised at all to find him just as productive as ever twenty years from now.

In closing, I would like to propose an applause for the local organizers of this workshop —in particular Virpi Niemela and Nidia Morrell— who have made this conference such an outstanding success and an enjoyable experience.

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