Concluding Remarks

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In the Heidelberg Workshop in 1999, Trevor Weekes devided the TeV sources claimed by that time into 3 classes, applying a criterion if they have been confirmed by independent observations, which brought about 4 solid and 3 likely sources of VHE (very high energy) γ-rays. Now after three years, Rene Ong showed in his summary talk of this workshop a source list which has 6 solid and 6 likely sources. The number of such sources is almost doubled, but the increment of 5 sources still may not be satisfying, depending on what kind of views we set in the future of VHE γ-ray astronomy. The Table shown below explains some more details of the source status. In the 4th column, the name of the claimed sources which need to be reconfirmed is indicated. Also indicated is the number of other putative sources, for instance, icluding those which are reported during this workshop,

Table 1. VHE γ-ray sources.

Type of Objects	solid	likely	to be confirmed	note
Pulsar/Nebula	2	1	1	PSR1509-58
Supernova Remnant	0	3	a few	Monoceros etc.
X-ray binary	0	0	Cen X-3	
Unidentifiec Object	0	1		
Others	0	0	2	GC, μquasar
Blazar	4	1	PKS2155, 3C66A	
Gamma Ray Burst	0	0	1	Milagro detection?
Starburst galaxy	0	0	NGC253	
Total	6	6	~ 10	

The groups located in the northern hemisphere have so far concentrated their observations mostly on extragalactic objects, *i.e.* blazars. The shape and time variability of energy spectra of blazars is an important key to infer the infrared background radiation in extragalactic space and/or to clarify the mechanism of radiation/particle acceleration in the blazar jets. We note that recent

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observations show a steady progress, as appearing in the reports during the workshop on the recently confirmed TeV blazar H1426+438 which is at a far distance of z=0.129. Efforts of the southern group, CANGAROO, has been rather on Galactic objects to study the origin of Galactic cosmic rays. Various ways were presented how to interprete the signal detected by CANGAROO from SNR RXJ1713, and the model of proton progenitor for VHE γ-rays has not been accepted by all the attendants. However, the arguments will continue and definitely deepen our understandings of SNR over the multiwavelength bands covering X-rays and GeV γ-rays. A concluding remark of the VHE γ-ray workshops was sometimes characterized by an expression "controversial", before we experienced the breakthrough in atmospheric imaging Čerenkov technique, *i.e.*, the detection of the Crab signal by the Whipple 10m telescope a decade ago. In contrast, the remark on this workshop can be "worthwhile results to debate about".

This workshop is along a line of many others in the past ten years which were entitled "Towards a Major Atmospheric Imaging Čerenkov Telescope" (*). Thus, another important and main topic of this workshop is about the now-going-construction of atmospheric imaging Čerenkov telescope. The H.E.S.S. and CANGAROO III projects are scheduled to commence stereoscopic observation soon in the next year, 2003. As a result, a considerable progress is expected in the years ahead to increase the number of sources, which will then set us to be capable to study VHE γ-ray sources in a systematic way as have been done for EGRET blazars in the case of the GeV energy. A similar study of SNRs would be also made possible by observing TeV γ-rays from a more number of objects.

However, just to increase the number of TeV γ-ray sources of a few particular types already known does not seem to be the only way that the future of VHE γ-ray observation will go along. Observation of VHE γ-rays suffers from a serious amount of background events, which have required a guidance of the results in other wavelengths such as X-rays and GeV γ-rays when we choose target objects of VHE γ-ray observation. In this context, the detection of an unidentified VHE γ-ray source by HEGRA group can be regared as a remarkable *mile stone* in the development of VHE γ-ray astronomy. It may be an omen of a number of *TeV peculiar sources* which are to appear when the system of multi-telescopes is successful to achieve a good suppression on the background events. Some of the objects on which observation has not been so far attempted may arise as an important unique target, in a light of various interests from different topics/areas in the astrophysics. An example can be given by TeV observation of a cluster of galaxies in relevance to structual acceleration, as presented by a talk in the

*a title invented by Patrick Fleury who organized the first one which was held in Palaiseau, Paris in 1993

workshop.

Generally, different types of objects would require different observational conditions as an optimum one. Although VERITAS, H.E.S.S. and CANGAROO may seem to construct a similar system of telescopes, significant differences exist when we look into the details of the telescope itself and the strategy how to plan observation. Different techniques of MAGIC, STACEE and CELESTE are also going on in parallel. Thus, all of these telescopes are, as a whole, to make VHE γ-ray astronomy prepared for unexpected developments that may take place.

The new generation of VHE telescopes might show us a variety of possible vistas of VHE γ-ray astronomy which may await us. ¿From new observations will come out new more results on new objects. Many workshops are to be held for us to learn those new results, presenting opportunities to enjoy seeing again the people who gathered during this workshop, to whom the *success* of this workshop owes very much, and thus to whom I like to express my gratitude.