in the field!) In particular, if this sample is representative of the real world, the cosmic scatter must be very small. Moreover it seems possible to improve the accuracy of the method by balancing the weight of the errors in each photometric variable. A solution is to choose brighter isophotes for massive galaxies in order to increase the range in surface brightness. A more complete analysis of the data is now in progress.

To conclude, an accuracy level of 12–15 % in extragalactic distances seems to be within arm's reach by this new luminosity indicator. It would be very important to confirm the result with a sample of ~ 100 galaxies, to calibrate the zero-point of the relation and to start the study of galaxy streamings at kinematic distances smaller than 8,000–10,000 km s^{-1}.

References

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A New Device for Performing High-Speed Polarimetric Measurements

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Introduction

The explosion of the supernova SN 1987A in the LMC on February 23, 1987, was such an exceptional event for the present generation of astronomers that all possible efforts are justified that could allow a deeper insight into the somewhat spectacular results obtained for the supernova. It is not our purpose to review here the descussions that were triggered by the observation of two different neutrino showers that raised the question as to whether the precursor of SN 1987A is now a black hole or a neutron star. If we assume the latter, it should be possible to carry out linear as well as circular polarization measurements synchronous with the perhaps fast rotating central star, as soon as the pulsar becomes visible. With respect to the distance modulus of SN 1987A, which is of the order of $18^{m}_{\cdot}5$, it is evident that we cannot directly observe in the visible domain the polarization of a central object in the supernova. However, it will perhaps be possible to measure the interaction of a strong and quickly varying magnetic field with the shell surrounding the pulsar. To derive a correlation between polarization and magnetic field, it must be possible to measure the polarization synchronously with the rotation of the neutron star. This can be implemented in a simple way also in the relatively slow ESO polarimeter PISCO. The intended modification has to be carried out in such a way that absolutely no interferences with the usual functions of the instrument can occur (Stahl et al., 1986). Therefore the proposed changes mainly have to be shifted onto the software facilities of the instrument. Since it requires much work to prepare the requisite programmes at a computer we have to start our modifications immediately and therefore at a time we are by no means certain about the usefulness of our efforts. However, once created, the intended modification can also be used for measuring fast varying objects like polars of DQ Her type.

Performance of the Modification

The multichannel analyzer described by K. Metz (1984) will be replaced by the ESO Time Series System (TSS) that allows data to be collected in four channels each msec and to write them in a special way onto a magnetic tape. For synchronizing the channels, the system additionally provides a 1 kilohertz signal from a CERME clock display unit that is connected with the ESO Universal Time to read out the UT. In describing the principle of the proposed modification of PISCO, all details of the phase plates and the polarizing prism that were described by K. Metz (1984, 1986) shall be omitted for the moment. Then the count-rates of the photomultipliers are proportional:

$$I +/- (Q \times \cos(4\delta(t)) + U \times \sin(4\delta(t)) \qquad (1)$$

I, Q, U are the Stokes parameters to be measured (if the quarterwave instead of the half-wave plate of the compensator is used, Q, U describe the circular polarization of the signal), +/– stands for the two multiplier channels 1 and 2 respectively, $\delta(t)$ is the instantaneous position angle of the optical axis of the continuously rotating phase plate.

Since the two channels of the polarimeter can work independently, only one channel (with sign +) will be considered for the following:

for $\delta(t)$ =

0°.0	the multi-	I+Q	(a)
22°.5	plier count	I+U	(b)
45°.0	rate is	I–Q	(c)
67°.5	proportional	I–U	(d)

Since one rotation of the modulating half-wave plate yields four identical measurements of the polarization, the Stokes parameters measured for a certain angle $\delta(t)$ repeat modulo 90°.

The basic idea of the modification is then very simple: If one wishes a polarization measurement for a certain phase position X of the pulsar than one has to wait for a coincidence of the pulsar phase X and the necessary half-wave plate position angles (a), (b), (c), (d), each modulo 90°. The times of the coincidences are indicated by the clock pulses of the TSS and the 32 pulses generated in the polarimeter in order to indicate the instantaneous position angle of the rotating half-wave plate.

Time Resolution

The time resolution of the proposed modification cannot be described in a general way since it depends not only on the fixed rotation frequency of 6 Hz of the modulating half-wave plate but also on the period of the pulsar in question. Since the rotation of the half-wave plate cannot be adjusted to a fractional number of the pulsar period two entire compromises have to be met:

(1) For the selected pulsar phase X a certain deviation has to be tolerated (however, the deviation should not far exceed 10 % of the pulsar period).

(2) The positions (a), (b), (c), (d) of the axis of the rotating phase plate can be selected only with an accuracy of $11^{\circ}_{\cdot}25$, corresponding to the distance of two subsequent clock pulses generated in the polarimeter during one rotation of the modulating phase plate. If P is the period of the pulsar, d = 5.21

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