ON-AXIS STELLAR MAGNETOGRAPH

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The double-circular analyzers of Babcock-type for stellar measurements are used at Hale, Lick, and Mauna Kea observatories. With this type of instruments, we obtain partial information of polarized light, namely I and V. In order to obtain all the Stokes parameters, we have to modify the Babcock's instrument in the following way;

1. rotate the analyzer at the diurnal rate,
2. move the retarder with respect to the analyzer,
3. use a plane-parallel plate so that the instrumental polarization due to the difference in the reflectivity of two linear polarization is compensated,
4. use an image rotator so that the two images corresponding to two linearly polarized light at the end of the analyzer be put into the slit of the coudé spectrograph at the same time.

Another way to make the same measurements is to put the retarder and the analyzer in the telescope tube so that the oblique reflections by coudé flat mirrors take place after the light passes the analyzer. Then, we can avoid the light losses and the errors due to the compensator, but we need a special secondary mirror and a relay lens system. 2 and 4 in the preceding paragraph are used with this type of instrument, too. For a horizontal coudé system for which the reflection angle at the fifth mirror changes with time, the use of "on-axis analyzer" is almost indispensable. I hope that the future project of the large telescope of Japan include it as one of the main auxiliary equipments. My colleagues and I also plan to have a proto-type on-axis magnetograph with the 188cm reflector of Okayama Astrophysical Station of the Tokyo Astronomical Observatory.