OPTICAL PROPERTIES OF RECENT BRIGHT COMETS C/2001 Q4 (NEAT), 73P/SCHWASSMANN-WACHMANN 3, 17P/HOLMES, AND 8P/TUTTLE DERIVED FROM APERTURE AND IMAGING POLARIMETRY. V. Rosenbush[1] (rosevera@mao.kiev.ua), N. Kiselev[1], K. Antoniuk[2], and S. Kolesnikov[3], [1]Main Astronomical Observatory of National Academy of Sciences of Ukraine, Kyiv, Ukraine, [2]Crimean Astrophysical Observatory, Nauchnyj, Ukraine, [3]Astronomical Observatory of Odesa National University, Shevchenko Park, 65014 Odesa, Ukraine

Introduction: A large diversity of composition from comet to comet leads to conclusion that there is no "typical comet". We present results of observations of several recent bright comets that demonstrate a significant variety in polarimetric properties of the comets. The reasons of differences and similarities in polarization of the investigated comets will be discussed.

Observations and some results:

Comet C/2001 Q4 (NEAT). The polarimetric observations of the comet in the R filter were carried out on May 21–23, 2004 at phase angles 77–75°. The 2.6-m telescope with a photoelectric photometer-polarimeter of the Crimean Astrophysical Observatory (CrAO) was used.

Simultaneous measurements of circular and linear polarization along the cuts which passed over the coma, nucleus and along the dust jet were obtained. There is a significant correlation of circular polarization with the changes of parameters of linear polarization along the cuts. This testifies that there is substantial component of polarization that is not related to the scattering plane and can be explained by inhomogeneity or anisotropy of dust medium.

73P/Schwassmann-Wachmann 3. This comet is interesting in many respects. In particular, the comet belongs to the group of "depleted" comets characterizing by low abundance of carbon [1] and the nucleus of this comet broke up into several subnuclei in 1995 [2]. Therefore it was interesting to compare polarization for different subnuclei. The polarimetric (aperture and CCD imaging) observations of the C, B, and G fragments of the comet were carried out in April–May 2006 when the phase angle changed from 38° to 67°. For observations the 1.25-m telescope with a five-channel aperture polarimeter and 0.7-m telescope with imaging polarimeter of the CrAO together with the wide-band R and I filters were used.

We found that polarization in the I filter is significantly less than that in the R filter for both nuclei B and C at all observed phase angles. The degree of polarization systematically increased with decreasing the measured area of the coma. In general, the discrepancy in polarization of different nuclei is within the accuracy of measurements.

17P/Holmes. The comet was observed on November 8–22, 2007 at the 1.25-m telescope of the CrAO with a photoelectric polarimeter and the R and I filters. The 12″ diaphragm was centered at a photometric nucleus and two regions of coma at the distance 6 arcmin to the north and the south of photometric nucleus. The comet was observed within the range of phase angles 16.1–11.3°.

Our observations showed that polarization of comet Holmes differs considerably from that for other comets, namely it is smaller than for any one of the previously observed comets and consequently the inversion angle of polarization is unusually low. Furthemore, the comet demonstrates atypical spectral dependence, i.e. the degree of polarization decreases with the wavelength.

8P/Tuttle. The polarimetric observations of comet Tuttle were obtained on January 10, 2008 with polarimeter of the 2.6-m telescope of the CrAO in the R filter when the phase angle of comet was about 68°. The same method of simultaneous measurements of circular and linear polarization along the cuts as above-mentioned one for comet Q4 (NEAT) was used.

The mean values of linear and circular (by absolute value) polarization degree along the cuts are $13.28 \pm 0.36\%$ and $0.60 \pm 0.07\%$ respectively. A typical value of linear polarization for dusty comets at the corresponding phase angle is about 20%. Hence, polarization degree of comet Tuttle is significantly low than that for typical dusty comets.

A comparitive analysis as well as a possible interpretaition of the results obtained for recent bright comets C/2001 Q4 (NEAT), 73P/Schwassmann-Wachmann 3, 17P/Holmes, and 8P/Tuttle will be given.

References: [1] Fink U., and Hicks M.D. (1996) *ApJ, 459*, 729-743. [2] Lisse C.M., et al. (1998) *ApJ, 496*, 971-991.