

*Database of Comet Polarimetry:*

*Kiselev, Velichko, Jockers, Rosenbush, Kikuchi*

*W.B. Sparks*

*College Park, MD*

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# Description

- Database presents published and unpublished comet polarimetry
- 2271 measurements, linear and circular, 64 comets, since 1940
- Narrow, broad band 0.3 to 3.5 micron
- Phase angle range 0.4-122 deg, 0.6-4.8AU (helio), 0.03-4.9AU (geo)
- 68 references
- ASCII table

# Review Questions

- **Completeness**
  - Of dataset and ancillary information
- **Intelligibility**
  - Formatting etc of data
- **Interpretability**
  - Are data descriptions adequate
- **Archival quality**
  - Is the data acceptable

# Data file

C/Hale-Bopp 1995 O1 1997 04 12.077 6840 15.5 -99.999 -.999 -99.99 -9.99 0.01 0.02 42.5 -99.99 -99.99 -.999 -.999  
 Manset, Bastien (2000)  
 C/Hale-Bopp 1995 O1 1997 04 12.088 6840 15.5 30 arcsec from centre 0.197 0.039 -99.99 -9.99 0.20 0.04 42.5 -99.99 -99.99  
 -.999 -.999 Manset, Bastien (2000)

| N Column | Position | Designation of column   | N Column | Position | Designation of column   |
|----------|----------|---|----------|----------|---|
| 1-4      | 1- 37    | Names of comet  |          |          |   |
| 5        | 39- 42   | Year  | 16       | 131-137  | Degree of the circular polarization (%)                               |
| 6        | 44- 45   | Month   | 17       | 139-143  | Error of the degree of circular polarization (%)                      |
| 7        | 47- 52   | Day (UT)  | 18       | 145-150  | Phase angle (degree)  |
| 8        | 54- 63   | Filter/Band (?)   | 19       | 151-157  | Position angle of the plane of scattering (degree)                    |
| 9        | 65- 69   | Diaphragm (arcsec)  | 20       | 159-164  | Deviation from the direction perpendicular to the plane of scattering |
| 10       | 71- 81   | Diaphragm (km) or box (km x km) projected on the comet            | 21       | 166-170  | Heliocentric distance of comet (AU)                                   |
| 11       | 83-103   | Offset diaphragm relative to nucleus of comet (km or arcsec)      | 22       | 172-176  | Geocentric distance of comet (AU)                                     |
| 12       | 105-111  | Degree of the linear polarization (%)                             | 23       | 178-212  | References according to references file                               |
| 13       | 113-117  | Error of the degree of the linear polarization (%)                |          |          |   |
| 14       | 127-132  | Position angle of the plane of polarization (degree)              |          |          |   |
| 15       | 126-130  | Error of the position angle of the plane of polarization (degree) |          |          |   |

# First few columns...

- IDL script to interrogate data file
- There are 2271 records; there are 64 unique names; year is 1940-2005 all as advertized
- Month is missing records 950-969 comet C/Tago-Sato-Kosaka
- Day is missing for records 681, 744-746, 950-961.
- BAND is character string but has UNITs Angstrom. E.g.; 4737 ;3200-6000; 5000/900; U (B,V,R,K). I'd like to plot vs. wavelength and not have to worry about doing the conversion. Extra numeric fields, wavelength & bandwidth?
- The diaphragm field when missing (often) is blank, no “unkown constant”. Could provide “unkown contstant” in PDS header instead of “blank”
- Two of the Swift/Tuttle diaphragms are zero, as opposed to blank, records 755, 756.
- The diaphragm (arcsec) is a real field, but diaphragm (km) is a character field that can be 2D.
- Likewise OFFSET does not have any formal units. Its stated to be either arcsec or km and is a character string. It seems to be used descriptively, eg “tail 150 arcsec”. I also found (spot check ) degrees used.

# Polarization Data

- There are 2252 linear polarization observations; 1404 with position angles. There are 62 circular polarization measurements. 46 have both linear and circular. Of the 2271 total records, there are three that do not have any polarization entries (all are “unknown constant”: records 27, 499, 681.
- Confusion between “degree of polarization” and “percentage polarization”. In my mind, degree of polarization is a formal term requiring values between 0 and 1. Here, it is used as the description for “percentage polarization”. The confusion is magnified by the units for position angle also being “degree”.
- Each field has different “unknown constants”  $-99.99$ ,  $-0.999$ ,  $-9.999$  etc. OK
- There are 349 negative values for linear polarization, ranging down to  $-42.2\%$ . Most of these are very small, around  $-1\%$ , ok, but  $-40\%$ ? Records 916-921 (C/Ikeya-Seki 1965) have tens of %s. Weinberg, Beeson 1976
- 230 of the linear polarization measurements do not have errors; nor 139 of the position angles.
- Are the circular polarization measurements significant? There are  $13\ 5\sigma$  results. Has attention been paid to the CP sign convention?
- Long definitions of some of the angles might be helpful.

# References

- Advertize 68 references but only 56 in references.txt
- Unclear what selection intent was (completeness, quality filter?). “Since 1940” be nice to have “Between 1940 and 2005”. ADS search with “comet” and “polarimetry” finds additional sources.

Examples (incomplete):

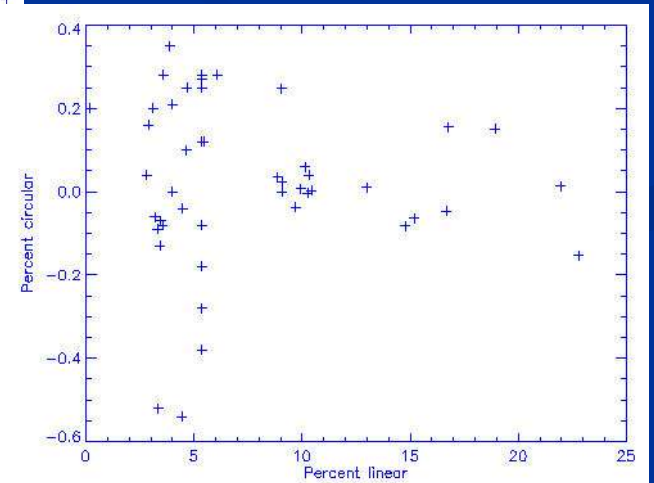
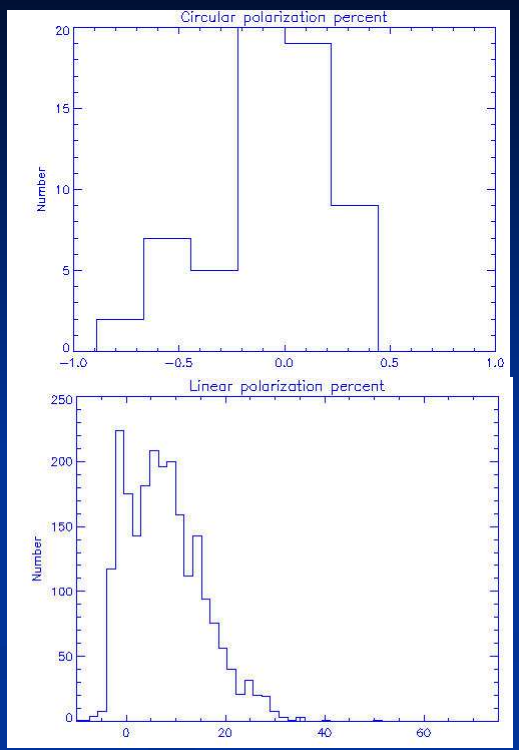
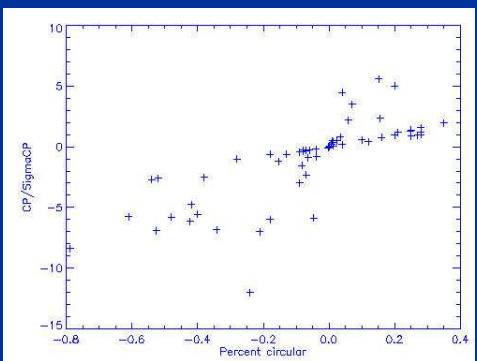
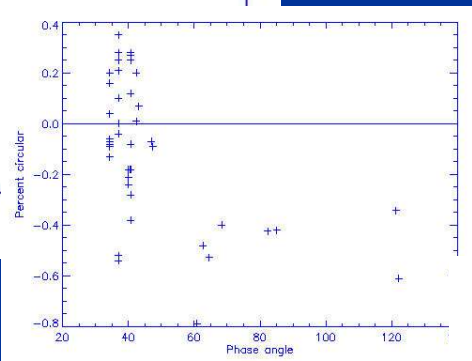
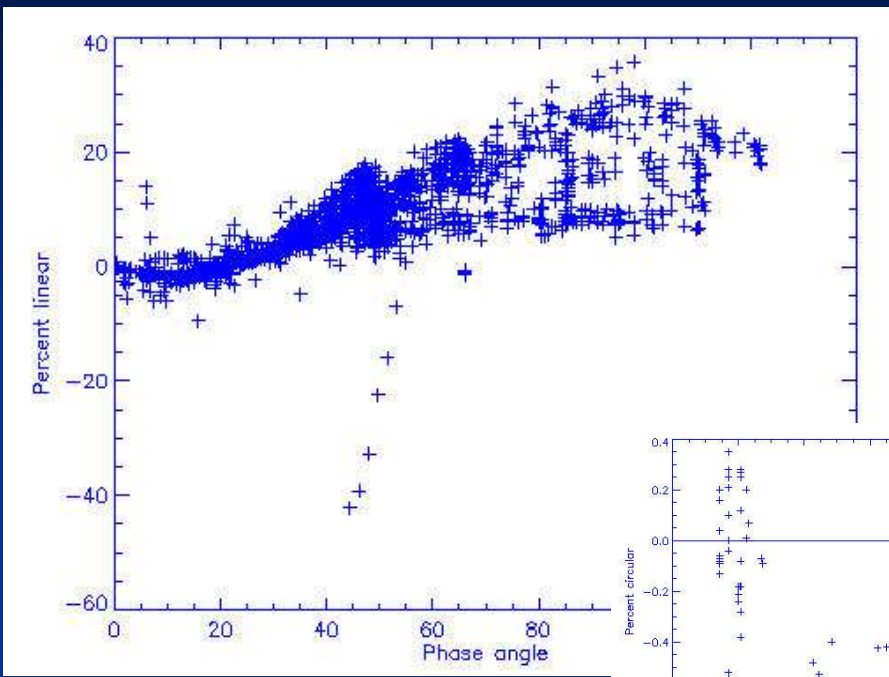
Furusho et al 1999, PASJ, 51, 367, Imaging Polarimetry and Color of the Inner Coma of Comet Hale-Bopp(C/1995 O1)

Gnedin et al 1999 Astronomy Letters, 25, 191 Polarimetric observations of Comet Hale-Bopp

Le Borgne, Leroy & Arnaud 1987 A&A 187, 527 Polarimetry of Comet p/ Halley - Continuum Versus Molecular Bands (There is a Le Borgne 87 reference in the datafile, see first point above)

Hough, 1987 A&A 187, 689 Polarimetry of Comet p/Halley

# Test results





# Reviewer Opinion

- Overall: an interesting dataset. Some more documentation on the logic of which datasets were included could be illuminating. A few minor issues with the database specifics.
- Completeness
  - OK
- Intelligibility
  - OK
- Interpretability
  - OK
- Archival quality
  - OK. Most measurements have associated uncertainties (though not all).