Millimetre observations of red quasars

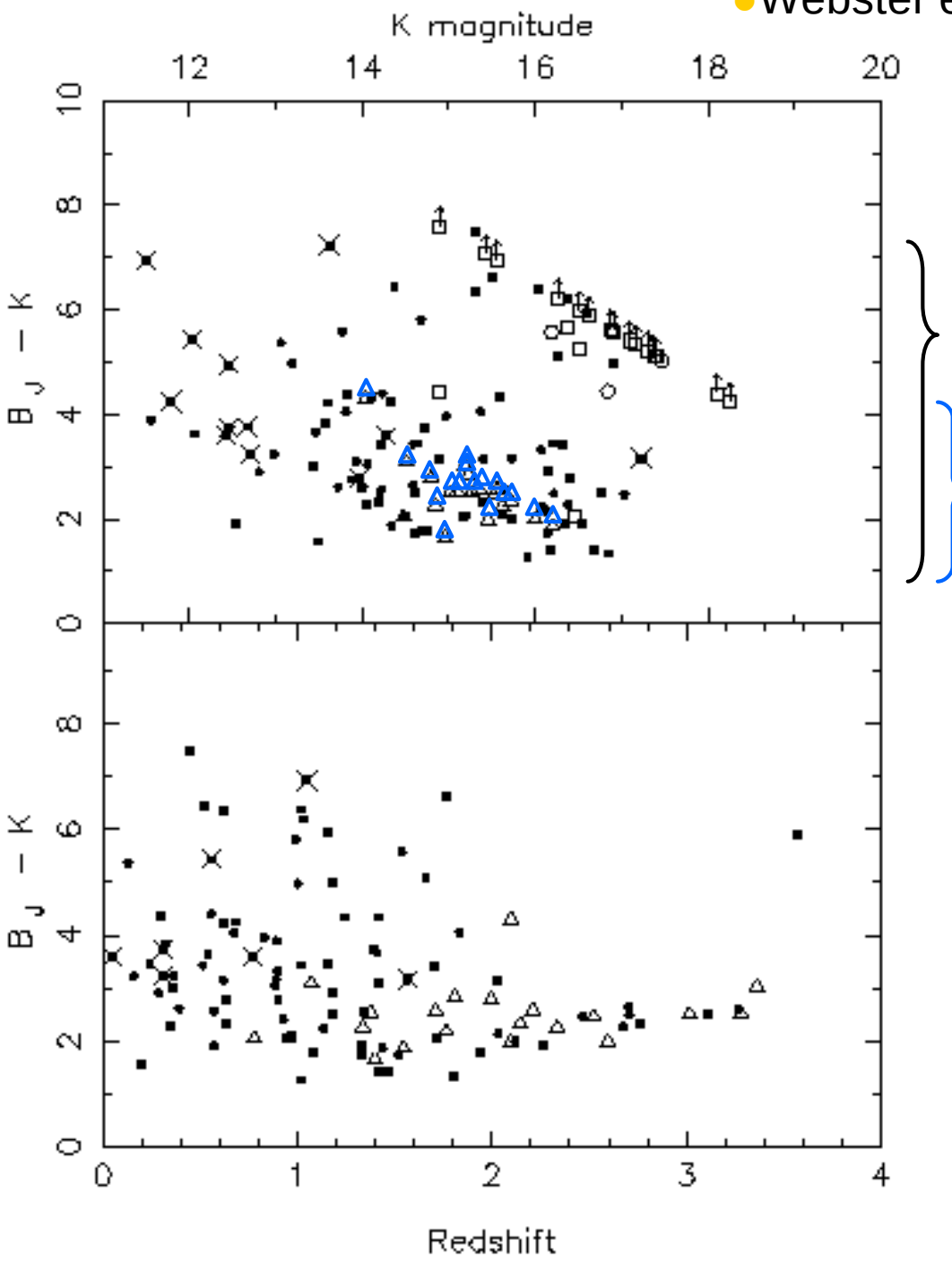
Michael Drinkwater (Melbourne) *in absentia*

- Dust in red quasars?
  - Rachel Webster (Melbourne)
- Variation of the fine structure constant?
  - Michael Murphy (UNSW)

Dust in Red Quasars?

- Large population of dust-reddened quasars
  - B-K colours of radio-selected quasars
  - Webster et al (1995)
- Associated mm-wave molecular absorption
  - IRAM+SEST, (Mopra) single-dish data -hard
  - Drinkwater, Combes & Wiklind (1996) -none found
- Synchrotron / power law SED models
  - Francis, Whiting & Webster (2000)
  - small fraction of red quasars due to dust
  - observe <u>these</u> with the ATCA

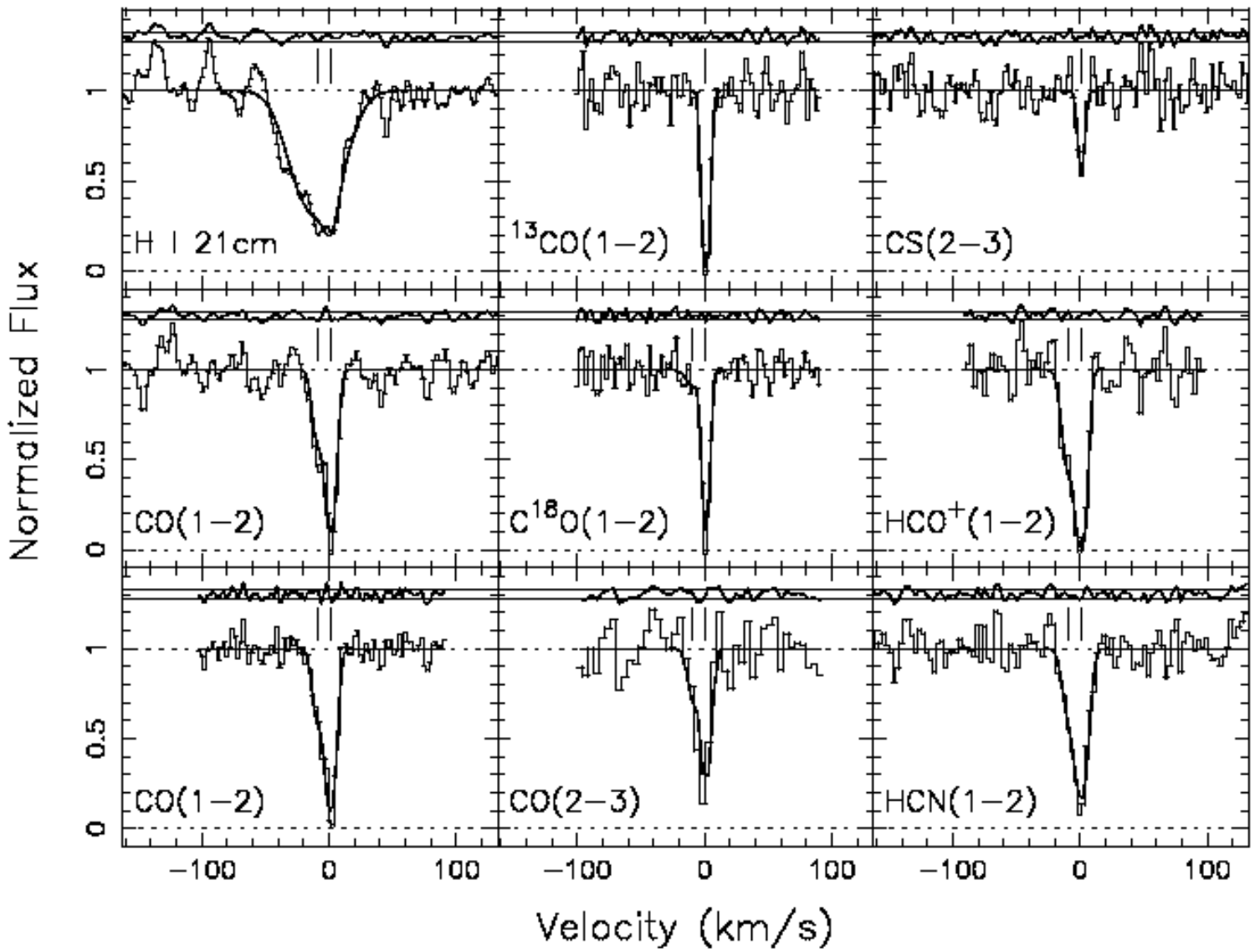
- Webster et al (1995, Nature, 375, 469)



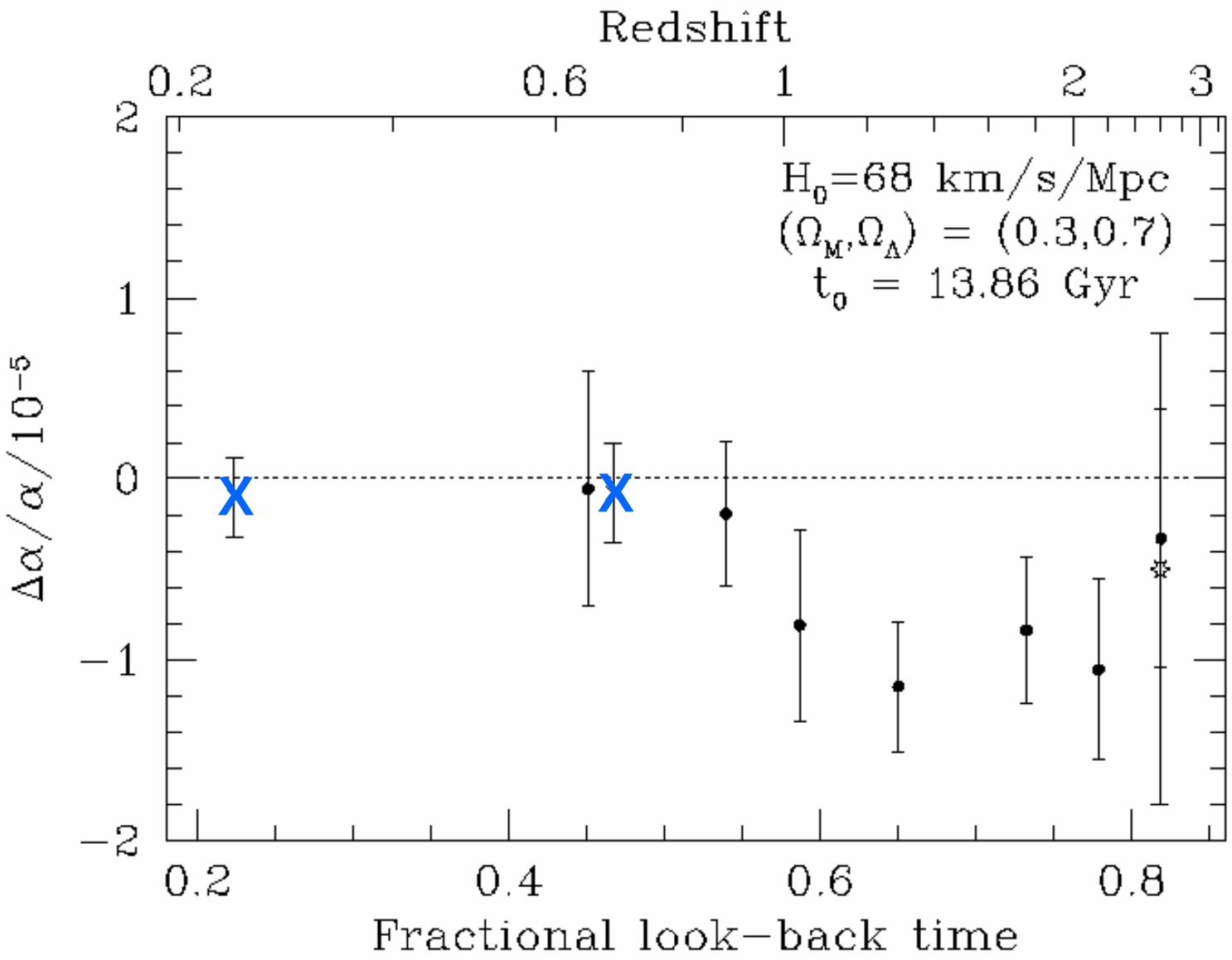
- Radio selection
- Optical selection

Variation of physical constants

- The laboratory: quasar absorption lines
  - rotational transition υ_{rot}: e.g. CO line
  - hyperfine transition υ_{hyp}: e.g. HI 21cm line
  - $\upsilon_{rot} / \upsilon_{hyp} \propto g_p \alpha^2 = y$
  - g_p=proton g-factor; α=fine structure constant
  - change in y observed as redshift offset
- Observational limits
  - $|\Delta y/y| < 5\times10^{-6}$ at z=0.25 and 0.68
  - Drinkwater et al (1998)



- Spectra of the z=0.68 absorption system towards TXS 0218+357 (Murphy et al 2001, MNRAS, 327, 1244)



- Comparison of new millimetre/HI constraints (crosses) on alpha variation with recent optical constraints (Murphy et al 2001, MNRAS, 327, 1244)