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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION RESEARCH AND TECHNOLOGY RESUME	
TITLE	Spatially Resolved Quantitative Spectroscopy of Comets
PERFORMING ORGANIZATION	Department of Astronomy University of California Berkeley, California 94720
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DESCRIPTION (a. Brief statement on strategy of investigation; b. Progress and accomplishments of prior year; c. What will be accomplished this year, as well as how and why; and d. Summary bibliography)	<p>(a) Strategy: Because of their temporal and spatial variations, modern ground-based studies of comets within ~ 4 A.U. of the sun are observationally demanding tasks. Over the years, we have attempted resolved spectroscopy of comets covering a wide range of intrinsic luminosity. Recently my group has developed spectral and direct-imaging procedures to detect weak ion tails submerged into the comae of even fairly faint comets.</p> <p>(b) Accomplishments: Although the last year was devoid of any really bright comet, re-analysis of older dust and gas production data with the benefit (hindsight) of the 1986 P/Halley apparition has been almost completed (with R.L. Newburn). The main changes are that the <u>nucleus</u> does make a significant contribution to continuum light, and that the gravity effect in the dust escape velocity is somewhat larger than previously assumed.</p> <p>On the direct observational side, spectral studies of 1987's Comet Bradfield show it to be qualitatively carbon-rich, at least in the outer coma ratio of CO+ and CO₂+, compared to H₂O+ with respect to Halley at similar heliocentric distances.</p> <p>(c) Anticipated Accomplishments: We are just beginning our observational study of comet P/Tempel-2 (with Wehinger, Wyckoff, and Belton at KPNO and our usual group at Lick Observatory). The [OI] $\lambda 6300$ line has just been (weakly) detected (May 12, 1988), so water production has commenced ($r = 1.89$ A.U.), despite the "puny" appearance of the cometary coma on that date.</p>

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(d) Publications (1987/88):

1. Belton, M.J.S., Spinrad, H., Wehinger, P.A., Wyckoff, S., and Yeomans, D.K., 1987, *Astron. & Ap.* 187, 569, The Spectral Behavior of P/Halley at Large Heliocentric Distance in Light of the Giotto/Vega Results.
2. Hanner, M.S., Newburn, R.L., Spinrad, H., and Veeder, G.J., 1987, *Astron. J.* 94, 1081, Comet Sugano-Saigusa-Fujikawa (1983V) -- A Small, Puzzling Comet.
3. Spinrad, H., *Ann. Revs. Astron. Astrophys.* 1987, 25, 231, Comets and Their Composition.
4. Wyckoff, S., Tegler, S., Wehinger, P.A., Spinrad, H., and Belton, M.J.S., 1987, *Ap.J.* 325, 927, Abundances in Comet Halley at the Time of the Spacecraft Encounters.