
Contents

Part I The Deep Impact Event

Previously Unobserved Water Lines Detected in the Post-Impact Spectrum

R. J. Barber, S. Miller, T. S. Stallard, and J. Tennyson 3

Keck 1 HIRES Observations of Tempel 1 at the Time of Impact

W. M. Jackson, A. Cochran 11

Deep Impact Groundsupport Observations of Comet 9P/Tempel 1: a Student Contribution

C. Sterken, Y. Bouzid, T. Tuvikene, N. Shafr, P. Okouma, E. Carillo, N. Vogt, S. Potter 25

Observations of Comet 9P/Tempel 1 and Deep Impact by the OSIRIS Cameras onboard Rosetta

M. Küppers, H. U. Keller, S. Fornasier, P. J. Gutiérrez, S. F. Hviid, L. Jorda, J. Knollenberg, S. C. Lowry, M. Rengel, The OSIRIS Team 29

Comets, Charisma, and Celebrity: Reflections on Their Deep Impact

R. J. M. Olson, J. M. Pasachoff 41

The Grain Evolution Model for Icy Grains Ejected from 9P/Tempel 1 by Deep Impact

E. Beer, D. H. Wooden, R. Schulz 59

JCMT Observations of the Deep Impact Event

I. M. Coulson, H. M. Butner, G. Moriarty-Schieven, L. M. Woodney, S. B. Charnley, S. D. Rodgers, J. Stüwe, R. Schulz, K. J. Meech, Y. Fernández, P. Vora 69

The Visual Brightness Behavior of Comet 9P/Tempel 1 During 1972–2005*V. S. Filonenko, K. I. Churyumov* 73**Imaging Polarimetry of the Dust Coma of the Deep Impact Target Comet Tempel 1***E. Hadamcik, A. C. Levasseur-Regourd* 79**Radio Observations from Australia of Comet 9P/Tempel 1 for Deep Impact***P. A. Jones, J. M. Sarkissian, M. G. Burton, M. A. Voronkov,, M. D. Filipović* 83**The Deep Impact Event as Seen from the University of Nariño Observatory – Colombia***A. Quijano Vodniza, C. Córdoba Barahona, A. J. Quijano Vodniza, J. Perenguez López, and M. Rojas Pereira* 87**The Earth-Based Deep Impact Observing Program***K. J. Meech, J. Pittichová, and A. Delsanti* 91

Part II The Cometary Dust

Gemini-N Observations of the Dust Excavated from Comet 9P/Tempel 1 During Deep Impact*D. E. Harker, C. E. Woodward,, D. H. Wooden*..... 115**Release of C_2 Radicals after the Deep Impact Event***R. Schulz, J. A. Stüwe, C. Erd, D. Martin, H. Smit* 121**A Search for Deep Impact’s Large Particle Ejecta***M. S. Kelley, W. T. Reach,, C. E. Woodward*..... 125**Subaru/COMICS Mid-Infrared Spectroscopic Observations of the Dust Plume from Comet 9P/Tempel***T. Ootsubo, S. Sugita, J. Watanabe, M. Honda, H. Kawakita, T. Kadono,, R. Furusho* 131**Modeling of the Terminal Velocities of the Dust Ejected Material by the Impact***M. Rengel, M. Küppers, H. U. Keller, and P. Gutiérrez*..... 137**The Subsurface Structure of Comet 9P/Tempel 1 Projected into the Dust Plume***T. Kadono, S. Sugita, S. Sako, T. Ootsubo, H. Kawakita, M. Honda, T. Miyata, R. Furusho,, J. Watanabe*..... 143

The Dusty View of DI from ESO Chile

H. Boehnhardt, N. Ageorges, S. Bagnulo, L. Barrera, T. Bonev, O. Hainaut, E. Jehin, H. U. Käufl, F. Kerber, G. LoCurto, J. Manfroid, O. Marco, E. Pantin, E. Pompei, H. Rauer, I. Saviane, F. Selman, C. Sterken, G. P. Tozzi, M. Weiler 147

Spectropolarimetry of the Deep Impact Target Comet 9P/Tempel 1 with HiVIS

D. M. Harrington, K. J. Meech, L. Kolokolova, J. R. Kuhn, K. Whitman 155

PAHs in Comets: An Overview

A. Li 161

Dynamical Modeling of the Deep Impact Dust Ejecta Cloud

T. Bonev, N. Ageorges, S. Bagnulo, L. Barrera, H. Bönhardt, O. Hainaut, E. Jehin, H. U. Käufl, F. Kerber, G. LoCurto, J. Manfroid, O. Marco, E. Pantin, E. Pompei, I. Saviane, F. Selman, C. Sterken, H. Rauer, G. P. Tozzi, M. Weiler 177

Serendipitous Occultation of U0975-07195164 by 9P/Tempel 1 Witnessed from LaSilla

H. U. Käufl, I. Saviane, V. Ivanov, T. Bonev, H. Boehnhardt 185

Part III The Cometary Nucleus

The Size of the Artificial Explosive Crater on the Nucleus of Comet 9P/Tempel 1

K. I. Churyumov, V. G. Kruchynenko, and L. S. Chubko 191

Comparison of the Spectra of the Comets 9P/Tempel 1 and C/2004 Q2 (Machholz)

L. S. Chubko, K. I. Churyumov, V. L. Afanasiev, I. V. Lukyanyk, V. V. Kleshchonok 197

Impact Cratering on Volatile-rich Targets: Some Remarks Related to the Deep Impact Experiment

P. Claeys 201

Part IV The Cometary Gas

Spectrophotometry of the Deep Impact Ejecta of Comet 9P/Tempel 1

K. W. Hodapp, G. Aldering, K. J. Meech, A. Cochran 215

Submillimeter Wave Astronomy Satellite Observations of Comet 9P/Tempel 1
F. Bensch, G. J. Melnick D. A. Neufeld, M. Harwit, R. L. Snell, B. M. Patten, V. Tolls..... 221

Gas Production by Deep Impact from Far-ultraviolet Observations
P. D. Feldman..... 227

Overview of Hubble Space Telescope Visible Imaging of 9P/Tempel 1 and Deep Impact
P. D. Feldman..... 231

Radio Monitoring of 9P/Tempel 1 Outgassing and Gas Released by the Impact
N. Biver, D. Bockelée-Morvan, J. Boissier, J. Crovisier, P. Colom, A. Lecacheux, R. Moreno, G. Paubert, D. C. Lis, M. Sumner, U. Frisk, Å. Hjalmarson, M. Olberg, A. Winnberg, H. Florén, A. Sandqvist, S. Kwok 233

The Chemical Composition of 9P/Tempel 1 from Radio Observations
J. Crovisier, N. Biver, D. Bockelée-Morvan, J. Boissier, P. Colom, A. Lecacheux, R. Moreno, G. Paubert, D. C. Lis, M. Sumner, U. Frisk, Å. Hjalmarson, M. Olberg, A. Winnberg, H. Florén, A. Sandqvist, S. Kwok 243

Fluorescence Cascades of Water and Carbon Dioxide in the Emission Spectrum of Comet 9P/Tempel 1
J. Crovisier 249

Temporal Evolution of DI Ejecta Based on NIRSPEC Observations at Keck 2: Parent Volatiles and Dust
M. A. DiSanti, G. L. Villanueva, B. P. Bonev, K. Magee-Sauer, J. E. Lyke, M. J. Mumma 251

Activity in Comet Tempel 1: Linking the Coma and the Nucleus' Surface
T. L. Farnham, D. D. Wellnitz, D. L. Hampton, J.-Y. Li, J. M. Sunshine, O. Groussin, L. A. McFadden, C. J. Crockett, M. F. A'Hearn, M. J. S. Belton, C. M. Lisse..... 265

ESO Spectrophotometry of Comet 9P/Tempel 1
M. Weiler, H. Rauer, C. Sterken, J. Knollenberg, E. Jehin, E. Pompei, O. Hainaut, G. P. Tozzi, J. Manfroid..... 271

Search for Ammonia Radio Emission in Comet 9P/Tempel 1 after the Deep Impact Event
G. P. Tozzi, F. Palagi, C. Codella, S. Poppi,, J. Crovisier 277

**Part V Cometary Plasma, Cometary Space Missions,
and the Future**

| | |
|--|-----|
| The Strength of Cometary Surface Material: Relevance of Deep Impact Results for Philae Landing on a Comet <i>J. Biele, S. Ulamec, L. Richter, E. Kührt, J. Knollenberg, D. Möhlmann, the Philae Team</i> | 285 |
| Rosetta/ROSINA and Chemistry in a Cometary Coma <i>S. N. Delanoye, J. De Keyser</i> | 301 |
| High-Speed R -Band CCD Photometry of Comet 9P/Tempel 1 <i>T. R. Mitchell, W. F. Welsh, P. B. Etzel</i> | 307 |
| How Tempel 1 Fits into the Ensemble of Comets: A Spectroscopic Perspective <i>U. Fink</i> | 311 |
| Dust Evolution of Comet 9P/Tempel 1 <i>J. Pittichová, Y. Fernández, K. J. Meech</i> | 317 |
| One Month of Near-IR Imaging Photometry of Comet 9P/Tempel 1 <i>Y. Mori, T. Sekiguchi, S. Sugita, N. Matsunaga, H. Fukushi, N. Kaneyasu, T. Kawadu, R. Kandori, Y. Nakajima, M. Tamura</i> | 323 |
| Author Index | 329 |

