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Editorial

50 years of *JQSRT*: Milestone papers

1. Introduction

The *Journal of Quantitative Spectroscopy & Radiative Transfer* (*JQSRT*) was founded under the leadership of professor Stanford S. (Sol) Penner, and its first issue appeared in 1961 with the foreword by the founding editor as shown in Fig. 1. This makes 31 December 2010 the last day of the 50th calendar year of publishing the journal. It is a delight for us to be able to introduce this celebratory issue of *JQSRT*, a journal which we have been proudly involved in for decades as authors, reviewers, associate editors, and, presently, editors-in-chief.

As part of our celebrations of 50 years of the publication of *JQSRT*, the current board of editors-in-chief and associate editors voted to select a subset of papers from the past which have been especially instrumental in defining the special place of this journal in the world of science. This task was not an easy one since the number of papers published in *JQSRT* now exceeds 7000. As a result of this vote, we have identified the 42 most significant papers in the broadly defined categories of spectroscopy [1–12], radiative transfer [13–22], electromagnetic scattering [23–32], and remote sensing [33–42]. To form this milestone *JQSRT* issue, we have narrowed this selection down by taking into account the number of points awarded to each paper as a result of the vote and by requiring that no more than one milestone paper have the same first author. The resulting selection of 17 milestone *JQSRT* papers is listed below. The reader will notice that, as an exception to the above rule, there are three *groups of papers* each having the same first author. However, only one paper from each group is reprinted in this special issue. Each number in square brackets in the following list represents the number of times a paper has been cited according to the ISI Web of Knowledge database[SM] at the time of submission of this Introduction (29 January 2010).

1.1. Spectroscopy

I. Tsao CJ, Curnutte B. Line-widths of pressure-broadened spectral lines. JQSRT 1962;2:41–91 [745].

II. Dieke GH, Crosswhite HM. The ultraviolet bands of OH. Fundamental data. JQSRT 1962;2:97–199 [844].

III. Humlíček J. Optimized computation of the Voigt and complex probability functions. JQSRT 1982;27:437–44 [193].

IV. Lee RW, Whitten BL, Strout II RE. SPECTRA—a model for *K*-shell spectroscopy. JQSRT 1984;32:91–101 [192].

V. Rothman LS, Gamache RR, Tipping RH, Rinsland CP, Smith MAH, Benner DC, Devi VM, Flaud J-M, Camy-Peyret C, Perrin A, Goldman A, Massie ST, Brown LR, Toth RA. The HITRAN molecular database: editions of 1991 and 1992. JQSRT 1992;48:469–507 [1281].
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Rothman LS, Barbe A, Benner DC, Brown LR, Camy-Peyret C, Carleer MR, Chance K, Clerbaux C, Dana V, Devi VM, Fayt A, Flaud J-M, Gamache RR, Goldman A, Jacquemart D, Jucks KW, Lafferty WJ, Mandin J-Y, Massie ST, Nemtchinov V, Newnham DA, Perrin A, Rinsland CP, Schroeder J, Smith KM, Smith MAH, Tang K, Toth RA, Auwera JV, Varanasi P, Yoshino K. The HITRAN molecular spectroscopic database: edition of 2000 including updates through 2001. JQSRT 2003;82:5–44 [574].
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VI. Pickett HM, Poynter RL, Cohen EA, Delitsky ML, Pearson JC, Müller HSP. Submillimeter, millimeter, and microwave spectral line catalog. JQSRT 1998;60:883–90 [302].

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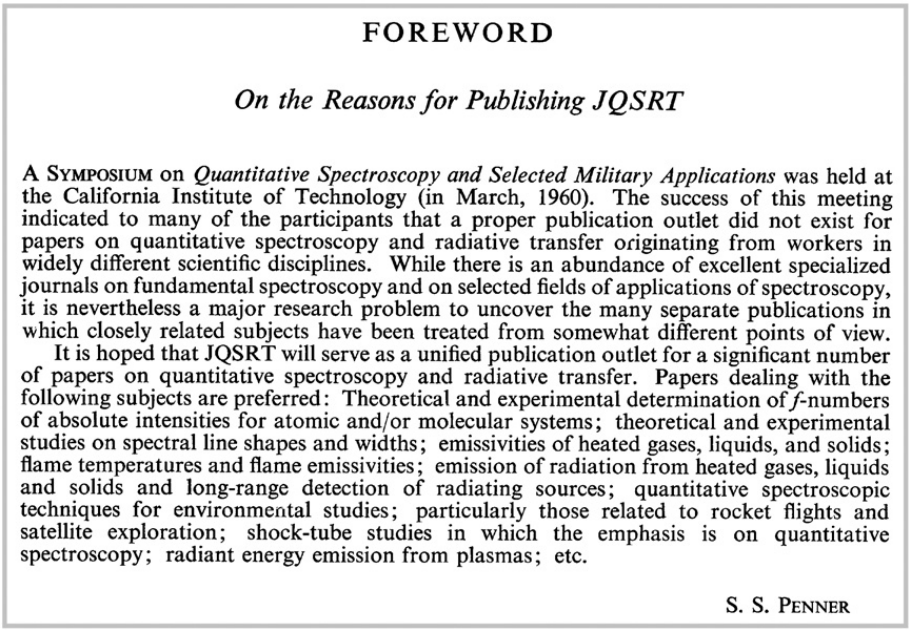

FOREWORD

On the Reasons for Publishing JQSRT

A SYMPOSIUM on *Quantitative Spectroscopy and Selected Military Applications* was held at the California Institute of Technology (in March, 1960). The success of this meeting indicated to many of the participants that a proper publication outlet did not exist for papers on quantitative spectroscopy and radiative transfer originating from workers in widely different scientific disciplines. While there is an abundance of excellent specialized journals on fundamental spectroscopy and on selected fields of applications of spectroscopy, it is nevertheless a major research problem to uncover the many separate publications in which closely related subjects have been treated from somewhat different points of view.

It is hoped that JQSRT will serve as a unified publication outlet for a significant number of papers on quantitative spectroscopy and radiative transfer. Papers dealing with the following subjects are preferred: Theoretical and experimental determination of *f*-numbers of absolute intensities for atomic and/or molecular systems; theoretical and experimental studies on spectral line shapes and widths; emissivities of heated gases, liquids, and solids; flame temperatures and flame emissivities; emission of radiation from heated gases, liquids and solids and long-range detection of radiating sources; quantitative spectroscopic techniques for environmental studies; particularly those related to rocket flights and satellite exploration; shock-tube studies in which the emphasis is on quantitative spectroscopy; radiant energy emission from plasmas; etc.

S. S. PENNER

Fig. 1. Foreword to the first issue of *JQSRT*.

1.2. Radiative transfer

VII. Mengüç MP, Viskanta R. Radiative transfer in three-dimensional rectangular enclosures containing inhomogeneous, anisotropically scattering media. JQSRT 1985;33:533–49 [132].

VIII. Truelove JS. Three-dimensional radiation in absorbing–emitting–scattering media using the discrete-ordinates approximation. JQSRT 1988;39:27–31 [75].

IX. Nakajima T, Tanaka M. Algorithms for radiative intensity calculations in moderately thick atmospheres using a truncation approximation. JQSRT 1988;40:51–69 [175].

X. Goody R, West R, Chen L, Crisp D. The correlated-k method for radiation calculations in nonhomogeneous atmospheres. JQSRT 1989;42:539–50 [170].

XI. Evans KF, Stephens GL. A new polarized atmospheric radiative transfer model. JQSRT 1991;46:413–23 [94].

1.3. Scattering

XII. Mishchenko MI, Travis LD, Mackowski DW. *T*-matrix computations of light scattering by nonspherical particles: a review. JQSRT 1996;55:535–75 [303].

XIII. Muinonen K, Nousiainen T, Fast P, Lumme K, Peltoniemi JI. Light scattering by Gaussian random particles: ray optics approximation. JQSRT 1996;55:577–601 [77].

XIV. Hovenier JW, van der Mee CVM. Testing scattering matrices: a compendium of recipes. JQSRT 1996;55:649–61 [36].

XV. Kahnert FM. Numerical methods in electromagnetic scattering theory. JQSRT 2003;79–80:775–824 [100].

1.4. Remote sensing

XVI. Burrows JP, Dehn A, Deters B, Himmelmann S, Richter A, Voigt S, Orphal J. Atmospheric remote-sensing reference data from GOME: part 1. Temperature-dependent absorption cross-sections of NO_2 in the 231–794 nm range. JQSRT 1998;60:1025–31 [96].
Burrows JP, Richter A, Dehn A, Deters B, Himmelmann S, Voigt S, Orphal J. Atmospheric remote-sensing reference data from GOME: 2. Temperature-dependent absorption cross sections of O_3 in the 231–794 nm range. JQSRT 1999;61:509–17 [165].

XVII. Klose AD, Netz U, Beuthan J, Heilscher AH. Optical tomography using the time-independent equation of radiative transfer—part 1: forward model. JQSRT 2002;72:691–713 [67].
Klose AD, Hielscher AH. Optical tomography using the time-independent equation of radiative transfer—part 2: inverse model. JQSRT 2002;72:715–32 [67].

Although this collection of milestone papers is the result of a collective vote, we cannot claim that it provides the most objective historical representation of *JQSRT*. However, we have done our best with the help of the current board of associate editors and hope that the reader will appreciate our objective and the outcome of our good-faith effort.

Each milestone paper (or group of papers) is preceded by a short introduction which puts the paper (or group of papers) in the proper historical context and provides an update in the form of a brief statement of the current state-of-the-art of the corresponding research field. In most cases these introductions were written by the original authors of the respective papers. In a few cases they were contributed by the relevant editors-in-chief.

An effort has been made to correct the milestone papers for known typos.

The collection of milestone *JQSRT* papers is preceded by a short foreword kindly provided by professor S.S. Penner.

We thank the founding editor S.S. Penner and the editor-in-chief Emeritus Prasad Varanasi as well as the former and present associate editors of *JQSRT* for their past and present contributions to the success of the journal. But first and foremost, we thank all authors, reviewers, and readers of *JQSRT* for their 50 years of continual and enthusiastic support. Without their hard work and contributions there would be no *JQSRT*.

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