

## **Editor's Note: Some Relativistic Cosmological Models**

**by Ronald Kantowski, B. S. in Physics, Austin, Texas, July 1966. [Current address: Department of Physics, University of Oklahoma, Norman, Oklahoma, USA.]**

This paper is unique in at least one aspect: it has made some impact on research in relativity even though it has not been published. It was circulated as a preprint, and citations of it had been spotted by this Editor long before he had a chance to read it. We publish it now as a historical document, and in order to make it possible for other researchers in relativity to look it up. Most of the material of this paper has already diffused into literature in one way or another,<sup>1</sup> but the original presentation can still be a useful source.

— *Andrzej Krasinski, Associate Editor*

### **Brief biography**

I was born 18 December 1939 in Shreveport, Louisiana (USA). I enrolled in physics at the University of Texas (UT) Austin in 1958 intending to study electronics but found that mathematical physics was my real calling. After graduating in 1962 I worked for a short period at the UT Medical School in Galveston TX, helping to establish a computer center for medical research. In 1963 I returned to Austin for graduate study at UT with R. K. Sachs. After receiving my Ph.D. in May 1966 I stayed

---

<sup>1</sup> A very brief account of some of the results was published in the now-classic paper by R. Kantowski and R. K. Sachs, *J. Math. Phys.* 7, 443 (1966)

on at UT for an additional year as a Visiting Assistant Professor and began work on optics in gravitational fields. The following year I joined the relativity group at Dallas and worked on optics in locally inhomogeneous Swiss cheese cosmologies, producing Ref. 1. Because of the prospect of measuring  $q_0$  by using type Ia supernovae as standard candles, this old work is of current relevance.

In 1968 I left Dallas to take a permanent position at the University of Oklahoma where I continue to teach and do research. In the 70's, I along with several coauthors, developed the theory of transparent gravitational lenses. This theory was completed some four years before multiply imaged quasars were detected. There were only four papers written in all, of which the two most frequently cited are Refs. 2 and 3. The theory developed in these four papers forms the core of much of the gravitational lens applications made today. In the 80's I started to work on quantum field theory projects such as the evaluation of Casimir energies for fields defined on Kaluza-Klein spaces. The quantum work evolved into a series of applications of the highly geometric effective action theory of Vilkovisky and DeWitt.

— R. Kantowski

## REFERENCE

1. Kantowski, R. (1969). "Corrections in the Luminosity-Redshift Relations of the Homogeneous Friedman Models", *Astrophys. J.* **155**, 89.
2. Bourassa, R. R., and Kantowski, R. (1975). "The Theory of Transparent Gravitational Lenses", *Astrophys. J.* **195**, 13.
3. Cooke, J. H., and Kantowski, R. (1975). "Time Delays for multiply Imaged Quasars", *Astrophys. J.* **195**, L11.