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throughout the Universe. Other possible explanations for a shorter light transit time are under investigation.

In his criticisms Matthews fails to comment on the crucial fact that detailed analyses¹ of galactic red shifts have apparently invalidated the $z \propto R$ relation so essential for the Big Bang, and have suggested instead that a $z \propto R^2$ relation is a much better fit to the data. In fact, Hawkins² has suggested that a $z \propto R^{2.22}$ relation is perhaps the best fit to the data.

Hawkins' relation for z can be obtained from the revolving-steady-state model if one assumes an average density $\rho = \sigma_0^{0.22}$, where σ_0 is an adjustable parameter. If the galaxies are held in orbit by gravitational attraction of the total mass

$$M = 4\pi \int_0^R \rho r^2 dr$$

within a radius R , then the red shift

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(for medium z values) from gravitational and transverse Doppler effects is about $z = 0.175G\sigma_0 R^{2.22}$. This calculation assumes the gravitational potential

$$\phi(R) = -G/R \int_0^R 4\pi\rho r^2 dr - G \int_{R_0}^R 4\pi\rho r dr,$$

where R_0 is the radius where the tangential velocity equals c . (Exact calculations show z becomes very large as $R \rightarrow R_0$). On the assumption that there is some "missing mass," a local density of 10^{-26} g/cm^3 would mean the Milky Way is only about 10^6 light-years from the Center (perhaps beyond Orion). This is close enough to the Center to reduce the observation of blue shifts.

The crucial question is whether there exists persuasive astronomical evidence that suggests that the Milky Way (or the Earth) is in such a privileged position. Apparently many astronomers are unaware of Varshni's³ penetrating analysis of quasar red shifts, from which he reluctantly concludes that the Earth must be near or at the Center of the Universe if quasar red shifts are of cosmological origin.

In conclusion I would like to remind my colleagues that the rotating-steady-state model was only recently conceived. Quite possibly, further revisions will be in order as investigations continue. In the meantime, it seems that Varshni's results deserve very close attention.

References

1. J. F. Nicoll, *et al.*, *Proc. Natl. Acad. Sci.* **77**, 6275 (1980); J. F. Nicoll and I. E. Segal, *Astron. Astrophys.* **115**, 398 (1982).
2. G. S. Hawkins, *Nature* **194**, 563 (1962).
3. Y. P. Varshni, *Astrophys. Space Sci.* **43**, 3 (1976); *ibid.*, **51**, 121 (1977).

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9/83

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General Electric Medical Systems Operations is delighted you chose an image from its nuclear magnetic resonance development program for the cover of your July issue highlighting medical physics. However, proper credit for the picture should note that it was acquired by Gary Glover and colleagues at GE-MSO and provided by James MacFall.

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8/83

Physicists on Korean plane

We wish to express our sorrow over the tragic and senseless death of Syo-Iti Kobayasi, a respected colleague from