

Regular and transitory showers of comet C/1979 Y1

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Abstract

We mapped the whole meteor shower complex of the long-period comet C/1979 Y1 (Bradfield). The modeled stream of the comet approaches the Earth's orbit in two filaments which correspond to two regular (annual) showers and in several other sections which survive only during a limited period (transitory showers). One of the regular predicted showers corresponds to the July Pegasids, No. 175 in the IAU MDC list of showers and one of the transitory filaments to the γ -Bootids, shower No. 104 [1].

Summary and Conclusions

For five perihelion passages of the parent comet in the past, we modelled associated theoretical streams, each consisting of 10 000 test particles, and followed their dynamical evolution up to the present. The models were characterized by a variety of values of free parameters, evolutionary time t_{ev} and the strength of the Poynting-Robertson drag β , and were used to predict a part, or parts, of the stream that can collide with the Earth. The predicted showers were compared with their observed counterparts separated from photographic, radio, and several video databases.

We confirm the earlier suggested generic relationship [2] between the studied parent comet and #175 July Pegasids, which we identified to one of our modeled filaments. The other regular filament corresponds to a daytime shower with the mean radiant situated symmetrically to the July Pegasids with respect to the apex of the Earth's motion. This shower is not in the IAU MDC list of meteor showers, but we separated it from the CAMS [3] and SonotaCo [4] databases, and suggest naming it α -Microscopiids.

These two filaments of the stream are deflected away from the Earth's orbit when the stronger influence of the Poynting-Robertson drag is considered. But it makes the stream cross the Earth's orbit in other sections. Corresponding showers are, however, only expected to survive during a limited period and to consist of particles of sizes in a narrow interval. We

identified one of these transitory filaments to the #104 γ -Bootids.

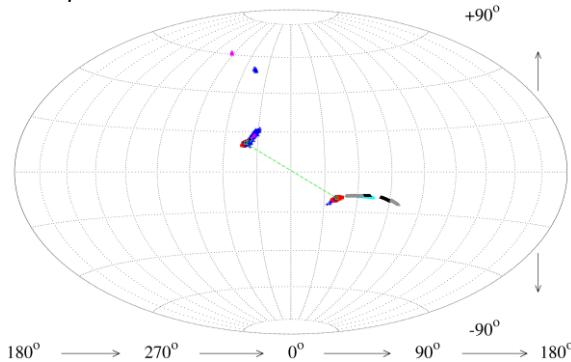


Figure 1: Positions of radiants of theoretical particles in regular filaments (red full squares – the model for $t_{ev} = 10$ kyr), and transiting filaments crossing the Earth's orbit (individual colors – blue, violet, cyan, black, and gray – distinguish between the radiants in the models for $t_{ev} = 80, 40, 20, 10$, and 5 kyr, respectively). The radiants are shown in the modified ecliptical coordinate frame with the center in the apex of the Earth's motion.

Acknowledgements

This work was supported by the Slovak Research and Development Agency, contract No. APVV-16-0148 and by the Slovak Grant Agency for Science, grant No. VEGA 2/0037/18.

References

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