

WORKING GROUP ON EXTRASOLAR PLANETS (*GROUPE DE TRAVAIL POUR LES PLANETES EXTRA-SOLAIRES*)

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1. Creation and Charge

The Working Group on Extrasolar Planets (hereafter the WGESp) was created with the following terms of reference, at the meeting of the IAU Executive Committee in June 1999. The WGESp was renewed, with the addition of one member, at IAU General Assembly 24 in August 2000. Following the resignation of the founding chair, Stuart Bowyer, Karen Meech was added to the WGESp in April 2001.

The WGESp was created as a Working Group of IAU Division III, with an appointment valid for an initial period up to the next General Assembly, then renewable for three years at a time. The proposal for the WGESp membership and Chairman was prepared jointly by the Presidents of Division III, Commission 16, and Commission 51, with approval by the Executive Committee. The charge of the WGESp is to act as a focal point for international research on extrasolar planets, and to organise IAU activities in the field, building on the preparatory work done by Commission 51. In particular, it should organise comparative reviews of techniques used to detect extrasolar planets and establish criteria for detections of varying degrees of certainty. As part of this activity, it is authorised to maintain lists of objects satisfying these criteria; if it so wishes, this responsibility may be delegated to a technical subgroup appointed by the WGESp Chair. The WGESp reports on its activities to the annual meetings of the Executive Committee and makes recommendations on such matters as it finds suitable, including any changes in the organization of IAU activities in the field.

2. Definition of a “Planet”

After a lengthy debate, on February 28, 2001, the WGESp adopted the following position statement regarding the definition of a “planet”.

Rather than try to construct a detailed definition of a planet which is designed to cover all future possibilities, the WGESp has agreed to restrict itself to developing a working definition applicable to the cases where there already are claimed detections, e.g., the radial velocity surveys of companions to (mostly) solar-type stars, and the imaging surveys for free-floating objects in young star clusters. As new claims are made in the future, the WGESp will weigh their individual merits and circumstances, and will try to fit the new objects into the WGESp definition of a “planet”, revising this definition as necessary. This is a gradualist approach with an evolving definition, guided by the observations that will decide all in the end.

Emphasizing again that this is only a working definition, subject to change as we learn more about the census of low-mass companions, the WGESp has agreed to the following statements:

1) Objects orbiting around solar-type stars with true masses above the limiting mass for thermonuclear fusion of deuterium (currently calculated to be 13 Jupiter masses for objects of solar metallicity) are “brown dwarfs” (no matter how they formed) while objects with true masses below this limiting mass are “planets”.

2) Free-floating objects in young star clusters (which presumably formed in the same manner as stars and have not been shown to be ejected from planetary systems) with masses below the limiting mass for thermonuclear fusion of deuterium are not “planets”, but are “sub-brown dwarfs” (or whatever name is most appropriate).

These statements are a compromise between definitions based purely on the deuterium-burning mass or on the formation mechanism, and as such do not fully satisfy anyone on the WGESP. However, the WGESP agrees that these statements constitute the basis for a reasonable working definition of a “planet” at this time. We can expect this definition to evolve as our knowledge improves.

Note that these statements are restricted to extrasolar planets and are not intended to address the question of a possible lower mass limit for “planets” in our Solar System.

3. Conferences

Considering that a very successful Symposium was held at the Manchester General Assembly on the subject of “Planetary Systems in the Universe” (IAU Symposium 202), and that the field of extrasolar planets continues to enjoy a preponderance of meetings, the WGESP has not felt the need to organize any further meetings on this subject. However, research on extrasolar planets will be included in several meetings at the next General Assembly, specifically Symposium 218 (“Stars as Suns: Activity, Evolution, and Planets”), Special Session 3 (“A New Classification Scheme for Double Stars”), and Joint Discussion 02 (“Mercury”), for which the WGESP is a participating commission. The WGESP will also support the Bioastronomy 2004 meeting, tentatively planned to be held in Iceland.

4. Planet Discoveries

At the time of this writing (September 2002), roughly 100 claims have been made for the detection of planetary companions to main sequence stars (see, e.g., the list maintained by Jean Schneider at <http://www.obspm.fr/encycl/encycl.html>, or the mirror site at <http://cfa-www.harvard.edu/planets/>). In addition, a millisecond pulsar is orbited by a system of planetary-mass objects (Wolszczan & Frail 1992). Nearly all of these claimed detections have been made by the spectroscopic (radial velocity) method, which opened up this new field of endeavor (Mayor & Queloz 1995; Butler & Marcy 1996). While the great majority of these claims are likely to be confirmed by subsequent observations, some may not. As a result, it seems best to adopt a conservative approach to maintaining an “official” IAU list of planetary candidates. [E.g., note that, with the exception of HD 209458’s transiting planet (Charbonneau et al. 2000; Henry et al. 2000), only a lower limit on the planetary mass is known. Some of the planetary candidates are likely to have true masses above the limit agreed upon by the WGESP (see above) for being a “planet”.] The WGESP is presently discussing how best to decide upon a list of planetary candidates. Once decided upon, this list will be available from the WGESP web pages, which may be found at <http://www.ciw.edu/boss/IAU/div3/wgesp/>.

5. A New IAU Commission?

The sensitive issue of the proper place in the IAU commission structure for research on extrasolar planets continues to be discussed by the WGESP. A majority viewpoint seems to be that the broad research areas encompassed by the new field of extrasolar planet research demands the creation of a new commission under Division III. Other WGESP members maintain that the proper place for this research is under the existing Commission 51 on Bioastronomy. We recommend that the IAU move forward with resolving this key question.

References

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