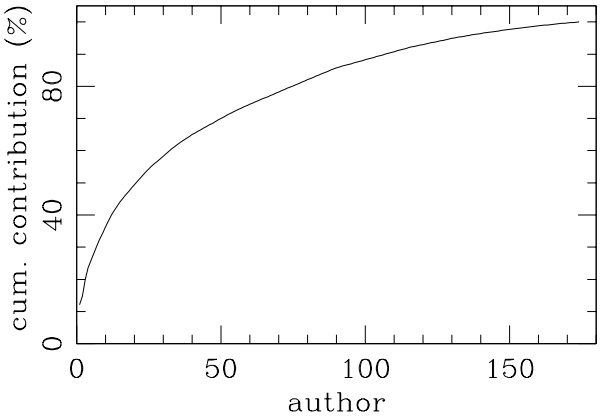

Fig. 8. Cumulative distribution of the contributions of authors to the publications of HH 1/2.

This cumulative distribution is shown in Figure 8. We find that the first author (author 1, who has the largest c_a value, see above) has a contribution of ≈12% of the total (normalized) publications on HH 1/2. From Figure 8 we see that 21 authors have contributed ≈50% of the total publications, and 107 authors have contributed ≈90%. These numbers represent the characteristic size of the group of authors who have worked on HH 1 and 2.

We have selected a "high production" set, composed of the 20 authors that have collaborated in at least 5 of the papers in our HH 1/2 database (see § 2). We have ordered this set of authors in such a way that close collaborators occupy neighbouring positions along the list. Figure 9 shows this list of authors, together with a "collaboration matrix". The diagonal elements ($C_{i,i}$) of this matrix correspond to the number of papers co-authored by each of the authors in the list. The non-diagonal elements ($C_{i,j}$; $i \neq j$) give the number of papers in which both the authors i and j appear in the list of co-authors.

In Figure 9, we note the presence of 4 groups of collaborators:

Group 1: there is a remarkably unified group of 5 collaborators (Rodríguez, Cantó, Torrelles, Ho and Curiel) in the upper right hand corner of the matrix. As can be seen from the references, this group has concentrated on line and continuum radio observations as well as models of the HH 1/2 system. It is clear that each of these authors has collaborated with all of the other four members of the group,

Groups 2 and 3: two small groups of three authors (Group 2 being composed by Raymond, Hartigan and Hartmann, and Group 3 by Eislöffel, Ray and Davis) are also evident. The papers of these two groups cover optical and IR observations. The papers of Group 2 also cover models of HH 1/2,

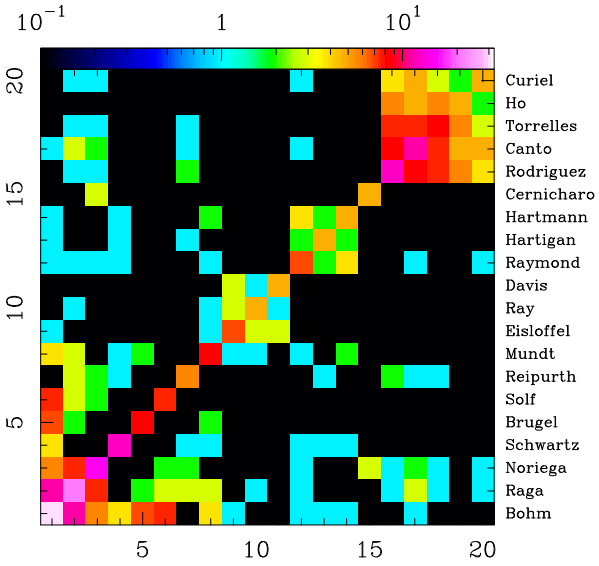

Fig. 9. Collaboration matrix. The diagonal elements give the papers including each of the authors, and the non-diagonal elements give the papers in which pairs of authors have collaborated. The order numbers correspond to the authors listed on the right of the plot. The color figure can be viewed online.

Group 4: the first 8 authors in our list (on the bottom, left-hand corner of Figure 9) also form a collaboration group. This group has a "core" of three authors (Böhm, Raga and Noriega-Crespo), who appear together in many papers. There is also a "secondary group" of 5 authors (Schwartz, Brugel, Solf, Reipurth and Mundt) who have collaborated with one or more of the members of the "core group" (see above), but not with all of the other members of the "secondary group". If one peruses the list of references, one sees that this group encompasses collaborations that have occurred over 5 decades, most of which are characterized by the unifying participation of K. H. Böhm. The papers of this group cover optical/IR/UV observations and models of HH 1/2.

It is also clear from Figure 9 that occasional collaborations have also occurred between the members of the four groups, evidenced by the presence of non-zero elements far away from the main diagonal of the collaboration matrix.