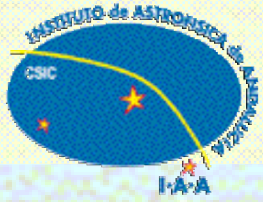
Secrets & Lies
in nebular astrophysics

(what I always wanted to know about H II regions and never dared to ask)

"The difference between a conference and a workshop is that in a workshop everybody speaks the truth"

(Y. Dutil, during the workshop *'Abundance profiles: diagnostic tools for galaxy history'*)







Outline

1. Questions
   - a) What is the ionization parameter?
   - b) Which is the structure of H II regions?
2. Answers

How many dimensions for an H II region?

H II regions are either...



or



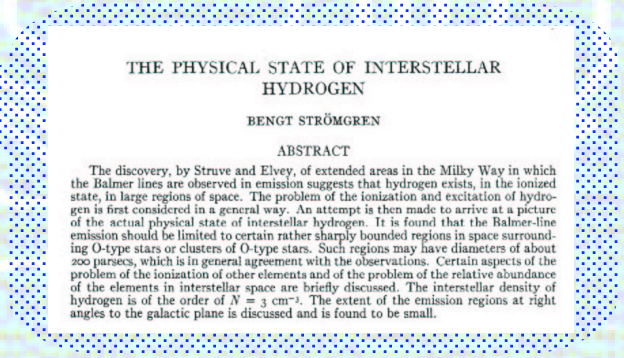
the b|O|b view

- Myself

- Mónica Relaño?

- Grazyna Stasinska?

- Strömgren?

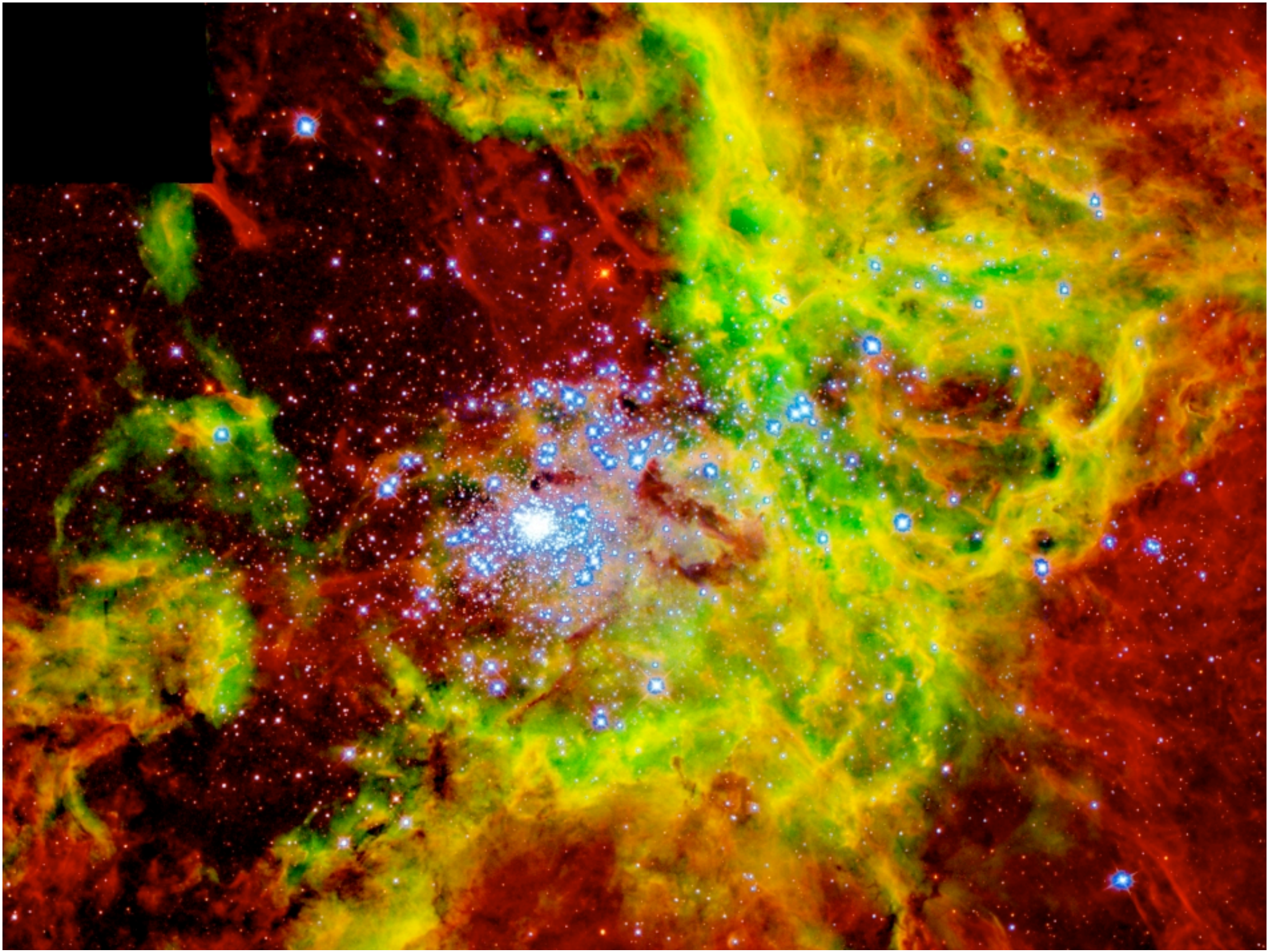


THE PHYSICAL STATE OF INTERSTELLAR HYDROGEN

BENGT STRÖMGREN

ABSTRACT

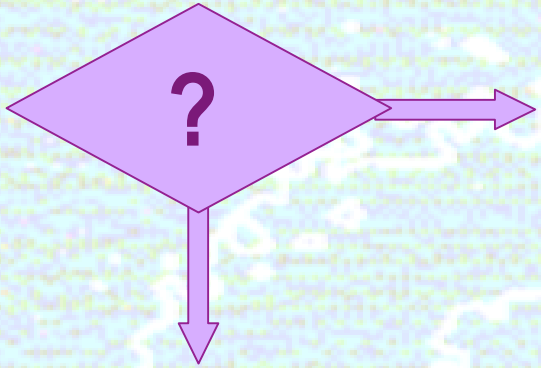
The discovery, by Struve and Elvey, of extended areas in the Milky Way in which the Balmer lines are observed in emission suggests that hydrogen exists, in the ionized state, in large regions of space. The problem of the ionization and excitation of hydrogen is first considered in a general way. An attempt is then made to arrive at a picture of the actual physical state of interstellar hydrogen. It is found that the Balmer-line emission should be limited to certain rather sharply bounded regions in space surrounding O-type stars or clusters of O-type stars. Such regions may have diameters of about 200 parsecs, which is in general agreement with the observations. Certain aspects of the problem of the ionization of other elements and of the problem of the relative abundance of the elements in interstellar space are briefly discussed. The interstellar density of hydrogen is of the order of $N = 3$ cm^{-3}. The extent of the emission regions at right angles to the galactic plane is discussed and is found to be small.



the thin sheet view



(O´Dell, 3D model of Orion)

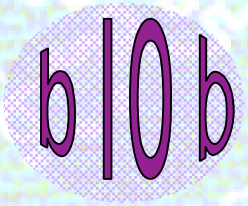


the ‘if - then’ view

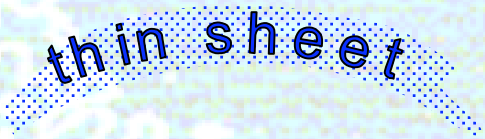
... e.g., young vs. old (but see Orion: O’ Dell 1995)

... or Galactic vs. giant (but: see Castañeda & Co, 1992-2000)

miscellaneous evidence

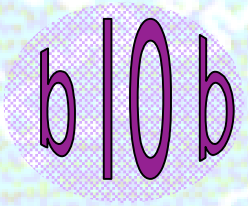


1. ionic segregation
2. Hα brightness distribution
3. density structure



1. filaments
2. coronal gas
3. molecular data

miscellaneous evidence

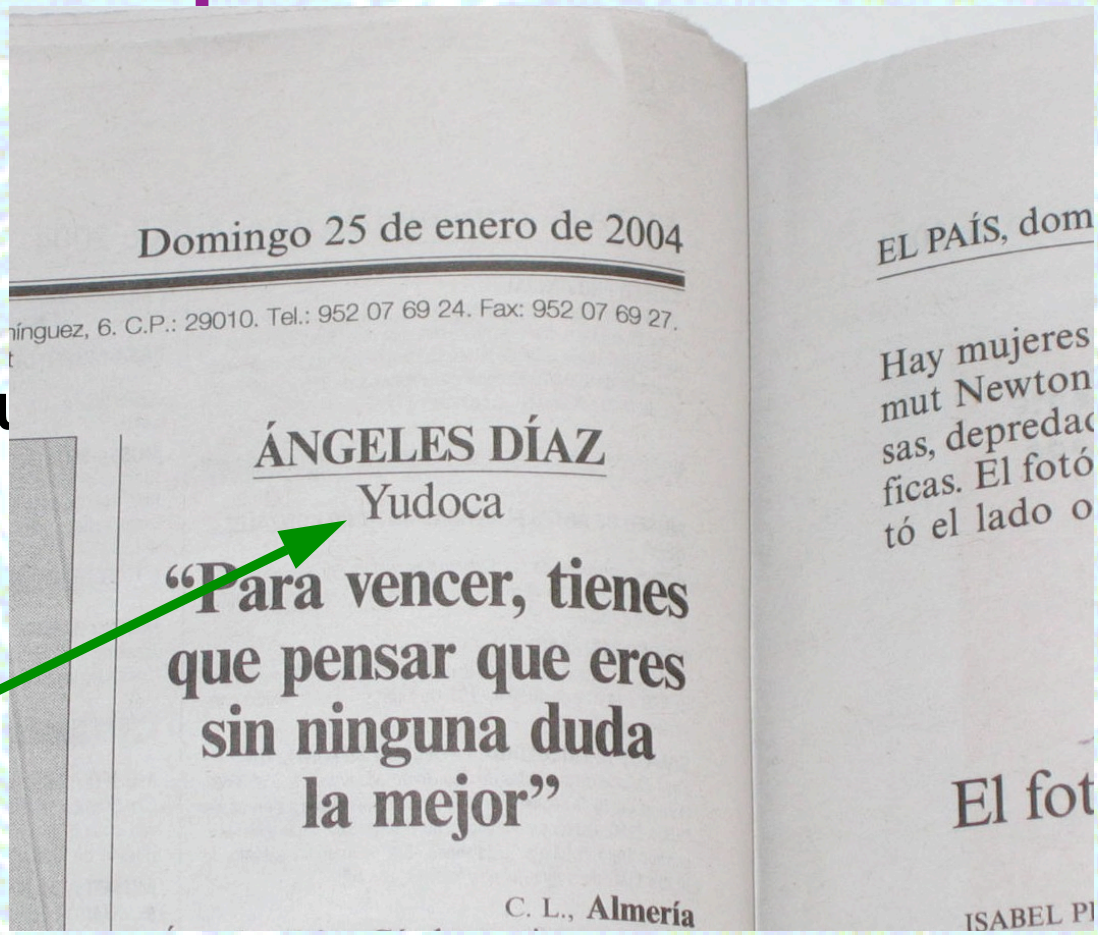


1. ionic segregation

2. Hα brightness distribu

3. density structure

Young Dense Clusters?


Domingo 25 de enero de 2004

ínguez, 6. C.P.: 29010. Tel.: 952 07 69 24. Fax: 952 07 69 27.

ÁNGELES DÍAZ

Yudoca

"Para vencer, tienes que pensar que eres sin ninguna duda la mejor"

C. L., Almería

EL PAÍS, dom

Hay mujeres
mut Newton
sas, depreda
ficas. El fotó
tó el lado o

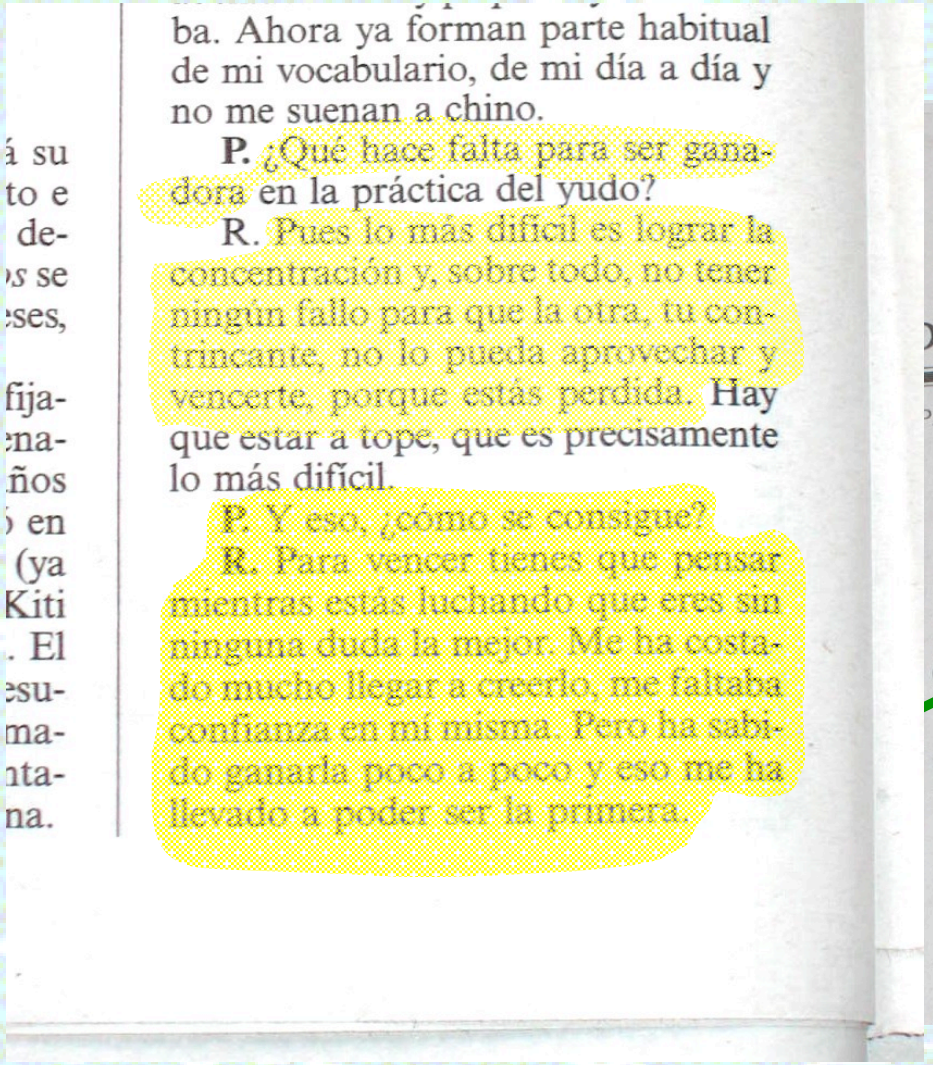
El fot

ISABEL P

most important:

Ángeles' recent declaration should not be underestimated

miscellaneous evidence



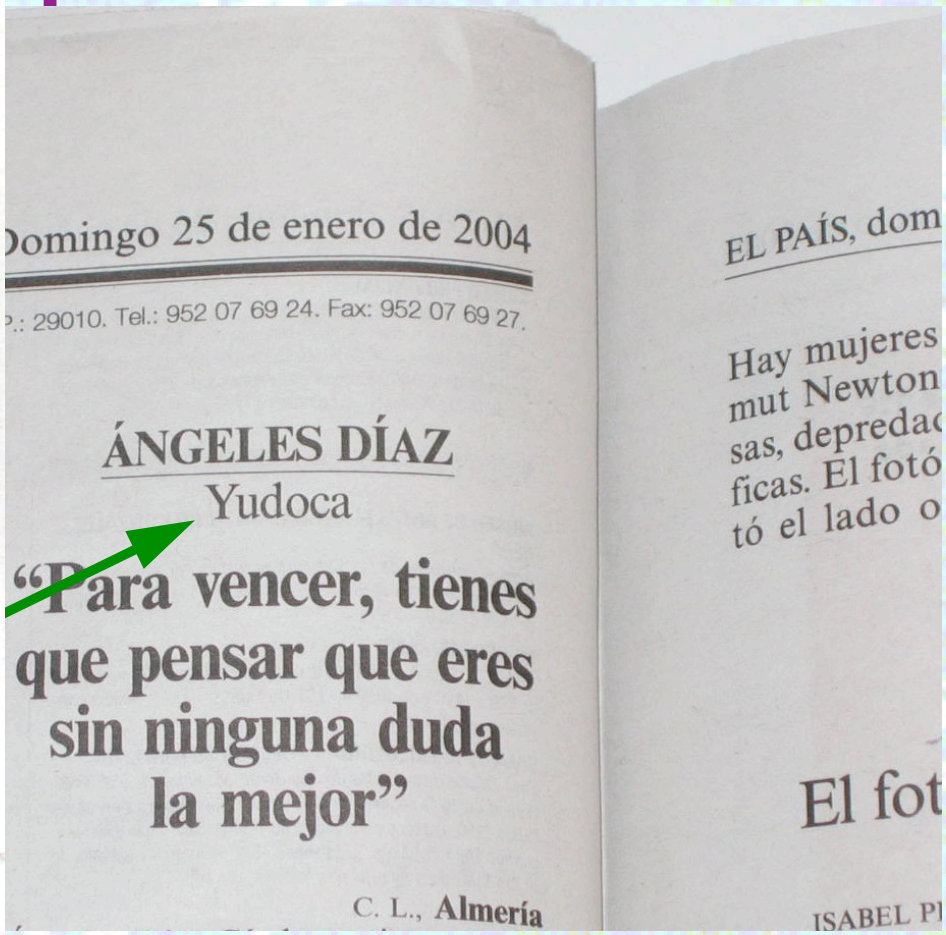
ba. Ahora ya forman parte habitual de mi vocabulario, de mi día a día y no me suenan a chino.

P. ¿Qué hace falta para ser ganadora en la práctica del yudo?

R. Pues lo más difícil es lograr la concentración y, sobre todo, no tener ningún fallo para que la otra, tu contrincante, no lo pueda aprovechar y vencerte, porque estás perdida. Hay que estar a tope, que es precisamente lo más difícil.

P. Y eso, ¿cómo se consigue?

R. Para vencer tienes que pensar mientras estás luchando que eres sin ninguna duda la mejor. Me ha costado mucho llegar a creerlo, me faltaba confianza en mí misma. Pero ha sabido ganarla poco a poco y eso me ha llevado a poder ser la primera.



Domingo 25 de enero de 2004

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ISABEL P

most important:

Ángeles' recent declaration should not be underestimated

the ionization parameter: my own disowned quantity

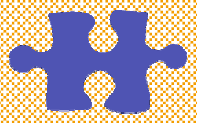
$$U \propto \frac{Q(\mathrm{H}^0)}{N_e \cdot R^2}$$

Spherical case: which *R*? which N_e? if *U*=*U(R)*, why *Q*(H^0)=*constant*? if *U* $\propto$ ionization degree, why not use ionization degree?

Plane-parallel case: what is *U* = *U(R)* for?

In general, ambiguity?

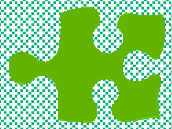
...question time!



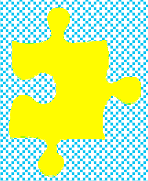
Is there a general geometric model for H II regions?



Is there a case-dependent geometric model for certain classes of H II regions?



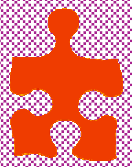
If H II regions are plane-parallel, why speak of ionization structure?



If H II regions are plane-parallel, what is the filling factor for?



If H II regions are spherical, is there a non-ambiguous definition of *U*?



What is *U* for?