**This is clearly a very important paper on a very important and contemporary topic. The authors are experts in this field and the quality of the work is unquestionable. Publication of this paper is certainly justifiable, but I am offering suggestions which I believe will make the paper more effective in terms of communication. I feel that with some minor editing that the paper could be more succinct, more direct, and therefore more effective.**

We thank the referee for very helpful comments. In the following the referee comments are in bold and our changes are described in normal text.

**The level of the reader that the paper is aimed at is not well established. Some very introductory things are explained. Some things which are not very critical to the paper are also explained. At times the paper places too much attention on unimportant details, which, I believe, distracts from the main message. Simply removing Figure 2 and discussion of the "primary mechanism" would be a great improvement with no loss of science content. In other words, 90% of the value of the paper is in section 4.3, and getting there sooner would probably be appreciated by all readers.**

We did put some thought into the organization of the paper. The purpose of Figure 2 and the discussion of the primary mechanism is to make it clear that we must study kappa in the context of photoionization by hot stars. This is one of the three key ingredients (the other two being the time and length scales discussed later in the paper) that distinguishes a nebula from the solar system and lab plasmas where kappa is important. The papers arguing for kappa have also argued that cosmic rays or MHD effects are significant energy sources for nebulae. Although these processes may occur, they are tiny in comparison with starlight photoionization.

**I think that discussing energies in terms of eV instead of kK makes more sense, as usually energies are being discussed and assigning a temperature, to my mind, obscures things. Specifically, in table 1, average photoelectron energies could be given in eV. Figure 1, since it is referred to in section 4.1 as a specific example, could be assigned a specific temperature and the x-axis could be given in energy. A specific value of kappa could then also be reported.**

This depends on the audience. Our paper is intended for astronomers working in the analysis of emission lines. The literature in that field uses temperature because the electrons are Maxwellian. The physics literature tends to use eV. We agree that it would be useful to have the energy in eV mentioned. This has been added as a column in Table 1. Figure 1 is only intended as a representation of the differences between a kappa and Maxwellian gas, so both axis are in arbitrary units. This has the advantage that no particular temperature need be specified.

**The choice of the Orion nebula as the sole HII region example is limiting. Since much of the impact of the ADF puzzle is in the extragalactic regime and the typical HII regions observed in other galaxies are substantially different (specifically with mean densities lower by two orders of magnitude, e.g., Kennicutt 1984 http://adsabs.harvard.edu/abs/1984ApJ...287..116K). It would be more persuasive if Table 2 were expanded to include the results of the same calculations for a giant extragalactic HII region as an example.**

We choose to focus on the Orion H II region because it is the benchmark nebula – the brightest and nearest and so the one that has been studied across the full electromagnetic spectrum. We must apply any theory first to Orion, before going on to fainter and more poorly understood objects.

We are working on a second paper that will discuss extragalactic H II regions and planetary nebulae, in addition to Orion. We have added a paragraph at the very end of the paper that describes the scope of this second paper.

**Section 4.3 would be more accessible if all calculated quantities were laid out in equation form. Key numbers could be labeled and reported in Table 2. For example, the ratio of the electron mean free path to the ionizing photon mean free path could be called something like R$_{\lambda}$ and the ratio of the heating timescale to the thermalization timescale could be called something like R$_{\tau}$ and these quantities could be reported in Table 2.**

We have not expanded the number of equations in the text. This is because the issue of the relevance of kappa in gaseous nebulae comes down to the few that we have presented. We believe that adding more material would reduce the "readability" of the text. This seems particularly important because the proponents of the relevance of kappa in gaseous nebulae appear not to have read the very complete presentations on photoionization physics subject in text books and in the early literature.

The second paper mentioned at the end of this ms is much more extensive, with numerical calculations showing how energetic electrons become thermal, and the resulting electron energy distribution. That paper does give such quantities.

**Reproducing equation 5-26 from Spitzer would also make the article more accessible (I realize that Spitzer can be found on-line).**

We added this as equation 5.

**The following are trivial edits:**

**In the introduction, the term relative abundances is used to refer to abundance relative to H. Frequently, relative abundances means something like N/O while absolute abundances means N/H or O/H. This could cause some confusion.**

We changed this to "abundances relative to hydrogen" in the Abstract and the Introduction.

**page 3**

**is give by ->is given by**

fixed

**then decays to -> then decay to**

fixed

**page 4**

**in neutral regions such as the H0 or H2 phases of star forming regions when high-energy photons enter ->**

**when high-energy photons enter neutral regions such as the H0 or H2 phases of star forming regions**

changed

**These suprathermal electrons, sometimes called 'secondary' or "knock-on" electrons.  is a sentence fragment Perhaps:**

**These suprathermal electrons, sometimes called 'secondary' or "knock-on" electrons, have been treated...**

Changed

**Cloudy -> CLOUDY  (check with first author)**

I prefer the mixed case but will go with the journal house style.

**suprathermal being ->**

**suprathermal e$^-$s being**

changed

**page 5**

**a typical photoelectrons ->**

**a typical photoelectron**

fixed

**A hydrogen atom ->**

**A neutral hydrogen atom**

This change has been made for clarity, but “officially” all H atoms are neutral, since $H^-$ and $H^+$ are ions.

**page 6**

**free path on an ->**

**free path of an**

fixed

**page 7**

**1 x 10^4K. The heating rate ->**

**1 x 10^4K, the heating rate**

**(pulling these out into equations would probably make things clearer)**

fixed

**as e$^{-3}$ so higher ->**

**as E$^{-3}$, so higher**

fixed

**whi cross section ->**

**while the cross section**

fixed

**Sentence starting "Assuming a solar" is a sentence fragment and contains a problematic mixture of super and subscripts on the n_O^2_+**

Three sentences near this point have been reworded.

**page 8**

**and the distance they move ->**

**and the distances they move**

fixed