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Reviewer's Comments:
Reviewer: 1

Comments to the Author
Report on MN-18-1764-MJ

The paper is well argued, and shows a plausible explanation for non-Zeeman circular polarization found in molecular spectra. I set out below some recommendations that I believe would improve the paper.

Introduction, p1, end of 1st column: It would probably be useful to just add a few lines of explanation about the GK effect. It appears to be transfer of polarized radiation through a Zeeman-split medium in the case where the Zeeman splitting frequency is larger than the rate of all processes except the Doppler width of the spectral line.
A statement similar to the above would make the paper more self-contained, and only the more interested reader would need to look up the original GK paper.

Section 2

Obviously, at the frequencies considered in the manuscript, one's choice of telescope is very limited, and it is rather unfortunate for this work that both the SMA and ALMA are equiped with linear feeds. If the authors are aware of any similar observations, probably at lower frequencies, where additional non-Zeeman circular polarization profiles and/or images have been obtained with telescopes equiped with circular feeds, I feel that a reference to that work would add considerable weight to the argument, since the calibration process is much less replete with sources of error.

Definition of Stokes-V

On line 4 of Section 2.1, Stokes V is written as 'left'-'right'. However, in the next paragraph, and in eq.(3), it is 'right'-'left'. I recommend that Stokes definitions should conform to the IAU standard of 'right'-'left' in all cases. The IAU definition also appears to agree with the definition of Stokes V as -2Im{E_x E_y^*} in the first paragraph of 2.1.

Additional Calibration Information

It is surprising that, for linear feed instruments, no mention is made of the correction for the parallactic angle. Obviously, this does not matter for true circular feeds, but it is not clear to me whether the 1/4 and 1/2-wave plate equipment used in the SMA linear feeds is insensitive to the parallactic angle.
Secondly, the intensity function in eq.(2) is the 'dirty' map, that is it is the true source intensity convolved with the instrumental beam. In a polarization observation there are slightly different (in general) beams for each hand of circular polarization, or each Stokes parameter. In AIPS, they have the file extensions, LBEAM, RBEAM, QBEAM, VBEAM etc. Were the Stokes-I and Stokes-V maps deconvolved with a model based on their own beam, or just Stokes-I? Which algorithm was used for cleaning by Miriad: Clean or maximum entropy?

Observations

1st para., l3: SMA data is described as having been measured using circular feeds. However, in the previous section, the SMA has been described as an instrument with linear feeds. It would be better to say that the data was obtained with the linear to circular wave-plate equipment installed.

Caption to Fig. 2: In the spectra, the Stokes-V lines are purple, not blue. [Blue is correct for the maps].

Section 5.2

As for the GK mechanism, I feel that this Section is missing a good basic physical description of ARS. The reader of a more mathematical bent should not be denied equations 5-10, but these formulae are just results that, in my opinion, convey almost nothing about the process itself. Of course, the reader may just wish to launch into the 2013 paper, but I think a short physical description would be very helpful. My attempt follows:

ARS is a matter-radiation interaction mechanism mediated by the second-order diagonal elements of the molecular density matrix (rather than the much weaker first-order off-diagonal elements). In the presence of a magnetic field, a small phase-change may be propagated at each scattering between the n-photon states of incident radiation that are linearly polarized parallel to, and perpendicular to, the magnetic field. This phase change leads to the appearance of circular polarization in the scattered radiation.