Session 32: Solar Physics Division Special Session
0930–1200 (Plaza Ballroom)

32.01 Prospects for the Solar-Stellar Connection
Outside the Optical Rami: A Matter of Resolution. T.R.
Ayres, Laboratory for Atmospheric and Space Physics, Uni-
versity of Colorado, Boulder.

The past several decades have witnessed the explosive
development of astronomical observations outside the do-
main of classical optical astronomy, often utilizing ra-
ther unorthodox techniques. Neutrons emitted from the
heart of the Sun have been captured in vats of cleaning
fluid, gamma-ray bursts have been detected from the direc-
tion of the Magellanic Clouds by satellites designed
to monitor atmospheric nuclear weapons tests, and gravity
waves from distant stellar cataclysms have been sought
with giant sapphire crystals cooled to within a few de-
crees of absolute zero. Furthermore, radio arrays and X-
ray observatories built to probe the most remote and an-
cient reaches of known space, have recorded microwave
flares from nearby solar-type dwarfs and extended our
knowledge of multimillion degree coronae from a single
example—our own Sun—to virtually all classes of stars.
These examples hardly begin to exhaust the remarkable
discoveries that have been made with the new observational
tools at the astronomer's disposal. Accordingly, the future
prospects for non-optical observations, even within the
narrow context of the solar-stellar connection, would appear
to be limitless, restricted only by one's imagination,
technical bravado, and the generosity of one's fi-
nancial sponsors.

For the sake of brevity, I would like to concentrate
on a single aspect of the solar-stellar connection—the
magnetic metallism of late-type stars—and address the
prospects for, and problems facing, future progress in
that area. I will demonstrate that fundamental questions
concerning the mechanisms that generate solar-like mag-
netic fields and impose spatial organization on the emerg-
ing flux cannot be answered without significant advances in
our ability to study surface features on stars other than
the Sun. Furthermore, direct imaging or pseudo-imaging
techniques must be coupled with high-resolution spectro-
scopy in order to diagnose macroscopic motions in stellar
magnetic active regions or in analogs of solar coronal
holes. The influence of flows on the plasma energetics of
the stellar outer atmosphere is an inescapable conclusion
of recent solar spectroscopy that is only just beginning
to be appreciated by those of us who study the chromospheres
and coronae of other stars. The coarse spatial resolution
that will be technically feasible in the next decade for
examining the magnetic structures of nearby stars will
strongly complement the very detailed studies of the solar
surface that will be obtained near the end of this decade
by the Solar Optical Telescope. Nevertheless, the most
important kind of resolution for the solar-stellar connec-
tion is the resolve that we astronomers must instill in
our elected officials to strongly support efforts to un-
derstand the intricate workings of our Sun in the broader
context of the late-type stars.

This work was supported in part by NASA grant NAG-
5199 to the University of Colorado.

32.02 Future Prospects for Solar-Stellar Optical
Observations. B. N. BOOP, U. Toledo. The past decade
has witnessed a dramatic upturn in our interest in
stellar surface activity, fueled largely by novel and
exciting observations at a variety of wavelengths.

Optical data, drawing heavily and fruitfully on solar
analogies, has been in the vanguard of this research
effort throughout the 1970's, yielding fundamental infor-

32.03 Future Prospects for the Theory of Coronal
and Flares. JAMES A. JOHNSON, Lab. for Astronomy and Solar
Physics, NASA/GSFC. One of the most exciting observa-
tional discoveries of this decade has been that tenuous
X-ray emitting plasmas are surprisingly common, found
in association with a variety of mechanically and/or rad-
iantly active astrophysical systems ranging from the
solar-coronal complex, early and late-type stars to acc-
cretion disks and active galactic nuclei. The logical
supposition that will be adopted here is that the site
of mechanical activity (differential rotation and con-
vection) and/or radiative activity (bolometric luminosity)
couples to and energetically maintains a spatially disti-
inct yet contiguous site of X-ray activity (corona).

This presentation focuses upon the theory of quasi-
steady energization and impulsive flaring of stellar
coronae. Specifically, I will first define the problem
of stellar-coronal coupling in a manner that allows
efficient interaction between observers and theorists.
Secondly, I will identify different investigative
strategies available to the theorist and conclude with a
discussion of how these studies provide an important
foundation for an understanding of astrophysical corona
in general.

32.04 Future Prospects for the Theory of
Solar-Stellar Winds. K. B. MACGREGOR, HAO/NCA.

In this paper, the prospects for advances in
the theory of mass loss from late-type stars are
assessed by delineating several outstanding
problems which must be solved if significant pro-
gress is to be made. We note that when the ob-
servational inferred properties of winds from
stars in the cool portion of the HR diagram are
compared against the predictions of existing
theoretical models, a number of discrepancies
become apparent. For example, in the case of
the sun, thermally-driven solar wind models

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