

## INTRODUCTORY ADDRESS

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Mr. Chairman, Official Representatives of the National, Regional and Local Government and Institutions, Ladies and Gentlemen,

The count-down to start our meeting is now over, and it is my great privilege and honour to give the Opening Address of the 71st Colloquium of the International Astronomical Union on "Activity in Red-Dwarf Stars". First of all let me thank all of you for accepting our invitation to attend the Opening Ceremony. Such an impressive gathering of so many distinguished astrophysicists from all over the world is in itself a reward for all of us in the Scientific and Local Organizing Committees for the demanding work which we have been doing. We hope to meet all your expectations for a pleasant and scientifically fruitful meeting.

Many people have made essential contributions at the various stages of the preparation of our Colloquium in its various scientific, organizational and financial aspects. All these combined efforts have made it possible, first to conceive, then to shape, reshape, implement and eventually see the beginning of the first meeting on Stellar Activity approved by the International Astronomical Union and the first I.A.U. Colloquium in Catania.

Other related meetings have preceded the present one in the recent past, such as those held at the Harvard-Smithsonian Center for Astrophysics, in Bonas and some of you are just emerging from the related Symposium in Zurich on Solar and Stellar Magnetic Fields. Actually, an ever increasing amount of work on stellar variability in the past two decades has promoted a widespread interest in stellar activity, both from an observational and theoretical point of view. Clearly, stellar variability is no longer a source of fear such as led our ancestors to label one of the most famous large-amplitude variable stars with the Arabic equivalent of "devil", i.e. Algol. On the contrary, stellar variability

phenomena are closely scrutinized because the pathological situations that trigger variability are an invaluable source of information in the study of stellar physics.

To synthesize all the pieces of information we have been collecting in the recent past, we are here to discuss, to agree - and maybe disagree - on observations and especially on interpretation and theories. Each of us is the depository of single pieces of a highly difficult puzzle, or mosaic, that needs to be put into place. Therefore, this Conference Hall is something like a puzzle box. In the coming days the puzzle box will be opened and, with the various pieces in our hands, we will try to speculate on which scenario is to be built and how to combine all the available pieces. However, we have a reference map to look at, the Sun. Its activity is known in, perhaps, too many details. Nevertheless, problems that were considered exclusively solar have now become central topics for stellar physics. Stellar spots, flares, plages, transition regions and coronae are very recent issues in astrophysics. The macroscopic phenomena we observe on stars are seen in much greater detail on the Sun, so that the microphysics of stellar activity is also available to us. Eventually, solar and stellar astrophysicists have found what a distinguished colleague, who is here with us, has properly defined a fruitful "two-way street", by interpreting the current trend of thought.

Solar-type phenomena in stars other than the Sun were postulated since the beginning of this century. But actual progress has required long-term dedicated observational and theoretical programs. Moreover, enormous stimulus has been given by recent observations with instruments on board artificial satellites that have allowed us to study the outer-most layers of stellar atmospheres in previously unexplored spectral bands.

My own view is, and I believe that most of you will agree, that the major achievement of the recent past is the concept that stellar atmospheres are not passive intermediaries between the stellar interior and the outside world: something more or less like opaque walls shaping the stars. Stellar atmospheres are "active" structures exhibiting a whole panoply of spectacular solar-type phenomena. If the "two-way-street" connecting solar and stellar physics is fully exploited, it will be possible to outline a much better picture of both the Sun and the stars. "If it ain't broke, don't fix it" goes an old American saying. But the classical picture of stellar atmospheric equilibrium and energy balance is somehow cracked and needs to be fixed, especially after the fundamental discovery of the important role of stellar magnetic fields, as a result of SKYLAB and EINSTEIN satellite observations. We will hear in the coming days additional exciting results from SMM and HINOTORI as well as from IUE, an apparently inexhaustible source of fundamental discoveries.

What are the motivations for a meeting in Catania on a specialized topic such as stellar activity on red-dwarfs? Several reasons underlie this choice. First of all, both solar and stellar research work have been a long-lasting tradition at Catania Observatory and at the Institute of Astronomy of Catania University: records of solar activity from the last century are on our files; dedicated photometry of several active stars was started in 1963, when I had what turned out to be the good fortune of beginning my thesis work on the now famous RS Canum Venaticorum system, which is one of the best example of stars showing huge photospheric, chromospheric and coronal activity phenomena.

Similar dedicated observations of another interesting "spotted" star, BY Draconis, were independently started in the Crimea soon afterwards. In subsequent years stellar activity observations were carried out at an ever increasing number of places. Apart from a few dispersed stellar flare observations, the sixties and seventies also witnessed a booming of systematic and fundamental research programs at Armagh, Byurakan, Catania, Crimea and McDonald Observatories. This large data base has already made important contributions to our knowledge of stellar flares and spot phenomena.

Lastly, thanks to a collaborative effort involving the Joint Institute for Laboratory Astrophysics (JILA), the Harvard Smithsonian Center for Astrophysics and the Armagh and Catania Observatories, dedicated research programs have recently been extended into the UV and X-ray bands to study in a more systematic way stellar activity in the outermost atmospheric levels. Also, recent theoretical work on stellar dynamos and on activity has been carried out successfully at Catania. I think that the above research activity justifies the choice of Catania for the 71st Colloquium of the I.A.U.. However, I should stress that the enthusiasm and total dedication of many colleagues, and friends, in the study of stellar activity in red-dwarf and related objects made the Colloquium possible.

I hope that at the end of this Colloquium, some of the small pieces of our puzzle will fall into place, so that an easier job will be left to the participants at the next meeting on "Stellar Activity", wherever it may be.