4th CESRA WORKSHOP ON

"FRAGMENTATION OF ENERGY RELEASE AND RADIO EMISSION FROM SOLAR, STELLAR AND MAGNETOSPHERIC PLASMAS"

European study Conference
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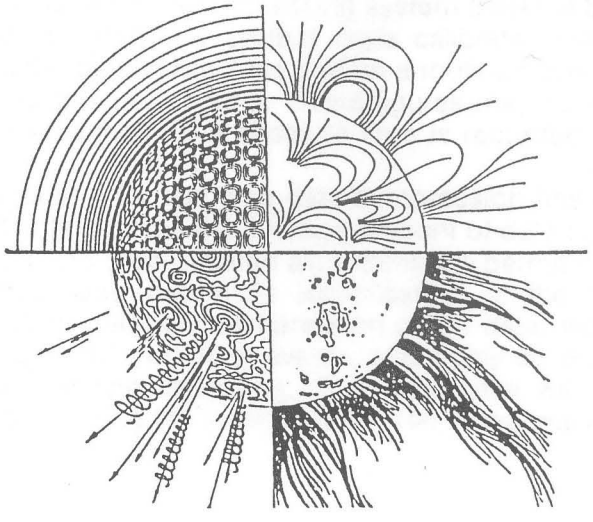
EUROPEAN PHYSICAL SOCIETY



Ouranoupolis-Halkidiki, Greece
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The real time processing solar radio spectrometer ARTEMIS

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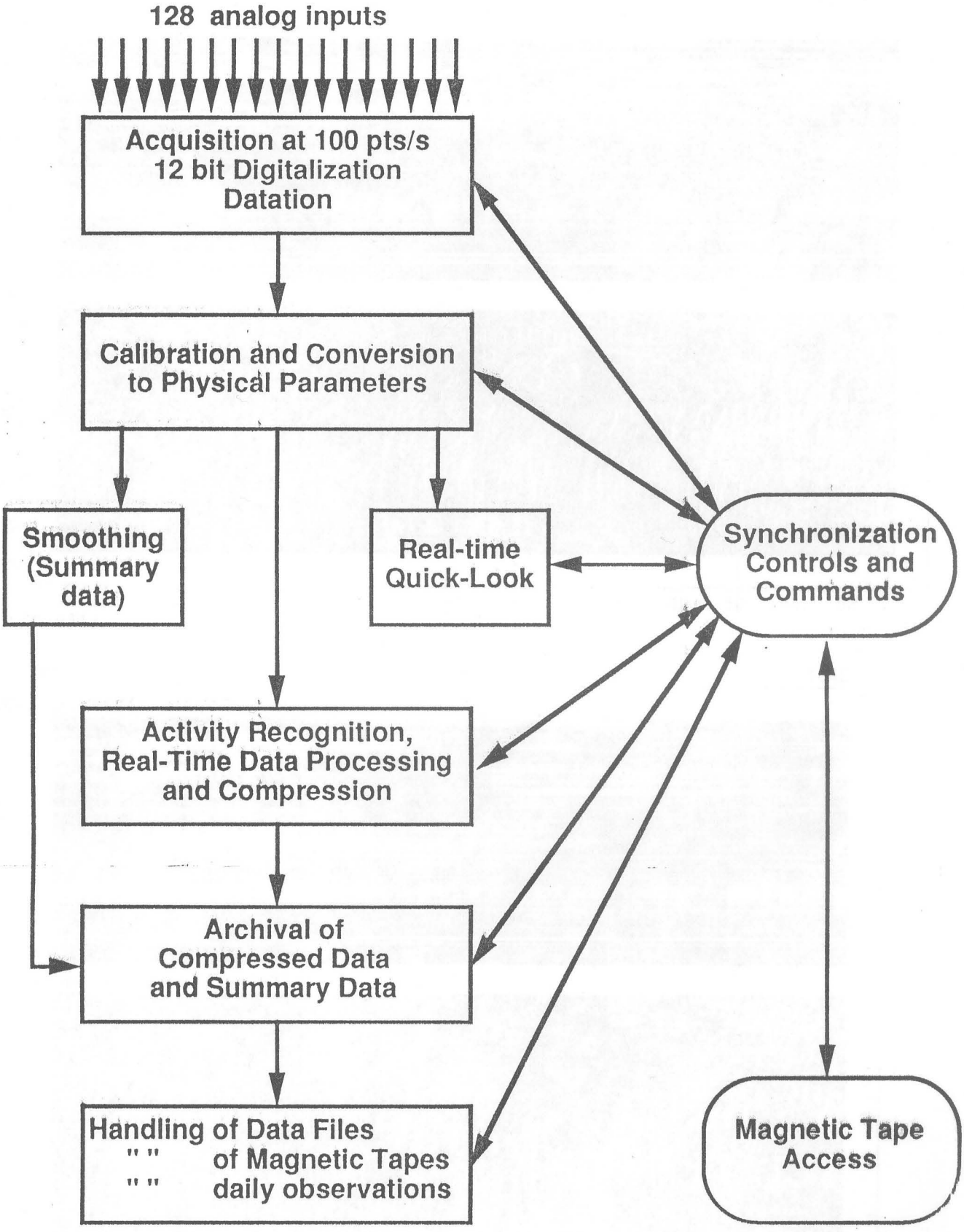
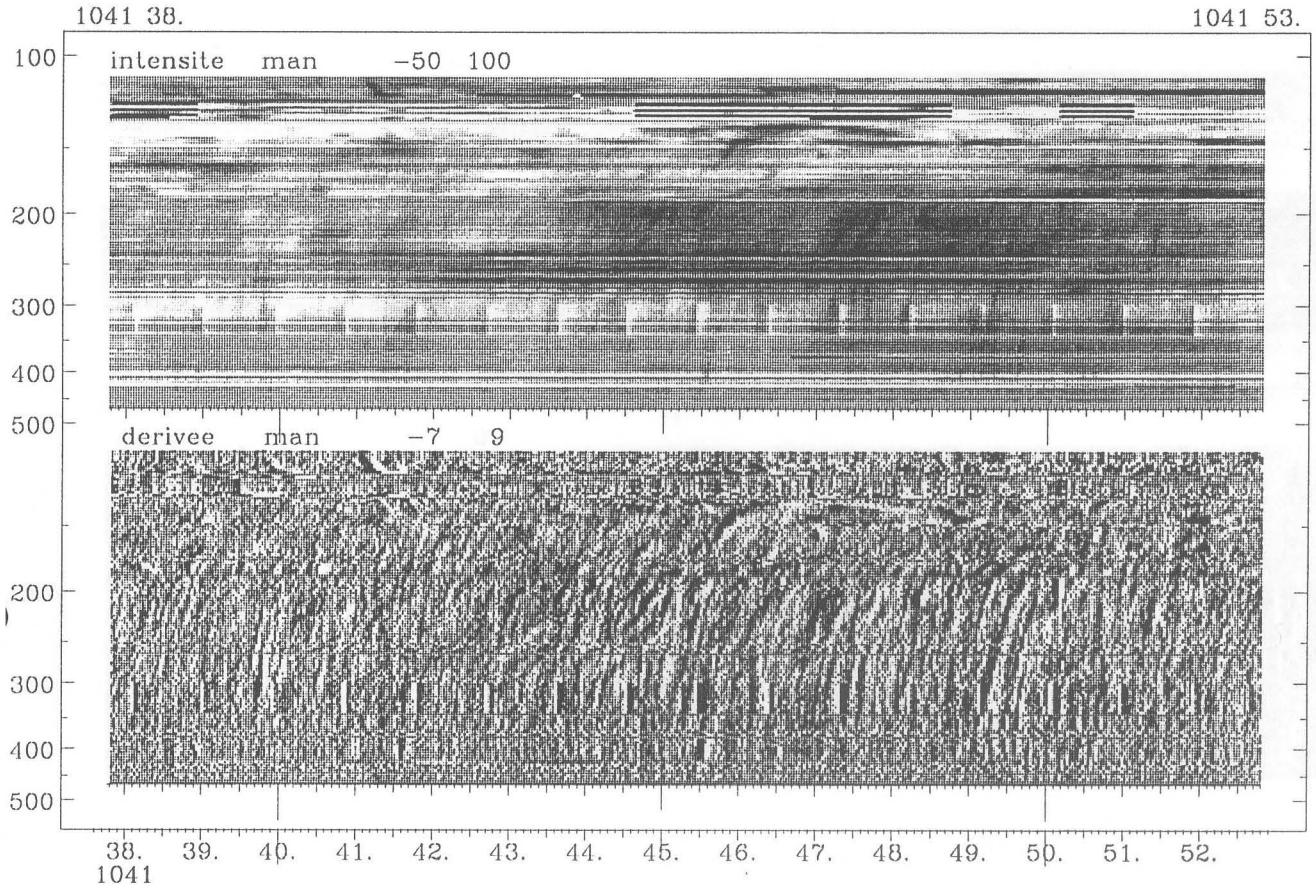
Decimeter and meter observations of solar bursts require a high time and frequency resolution, as well as a high accuracy in a large dynamic range (greater than 40 dB above the background). Such observations were carried out on a routine basis by the Nancay Multichannel Solar Radio Spectrograph of the Space Research Department of Meudon Observatory, from 1979 to 1986. However, the capabilities of the receiver were greatly by the data acquisition system which allowed us to record only 32 channels (between approximately 500 and 100 MHz) at a rate of 10points of 11 bits per second.

In order to exploit more fully the capabilities of the receiver, we have developed a new real time digital data acquisition and processing system (ARTEMIS), based on the Motorola MC 68010/68020 processors. This new system digits calibrates formats dates processes, compresses and achieves the data in real time and on a routine basis, for the 128 analog channels, at a rate of points of 12 bits per second. These figures may be extended up to 256 channels and 300 points/s (per channel). The absolute time is recorded with an accuracy better than 0.01 s.

An efficient algorithm for real time data compression has been especially designed for solar bursts, and routinely reduces the average amount of data to be archived per day from ≈ 1 Gbyte to ≈ 10 Mbytes. More sophisticated algorithms will permit additional compression during periods of high activity and automatic identification of the type of the events (pattern recognition). Thanks to this efficient compression of the data, we expect to build a very large data base of solar decimeter and meter events, accurately calibrated and digitized with a high resolution preserving their fine structures. This data base will be very useful for the Solar Physics Community, e.g. during the International Solar Terrestrial Physics Program (ISTP).

ARTEMIS: Functional Diagram

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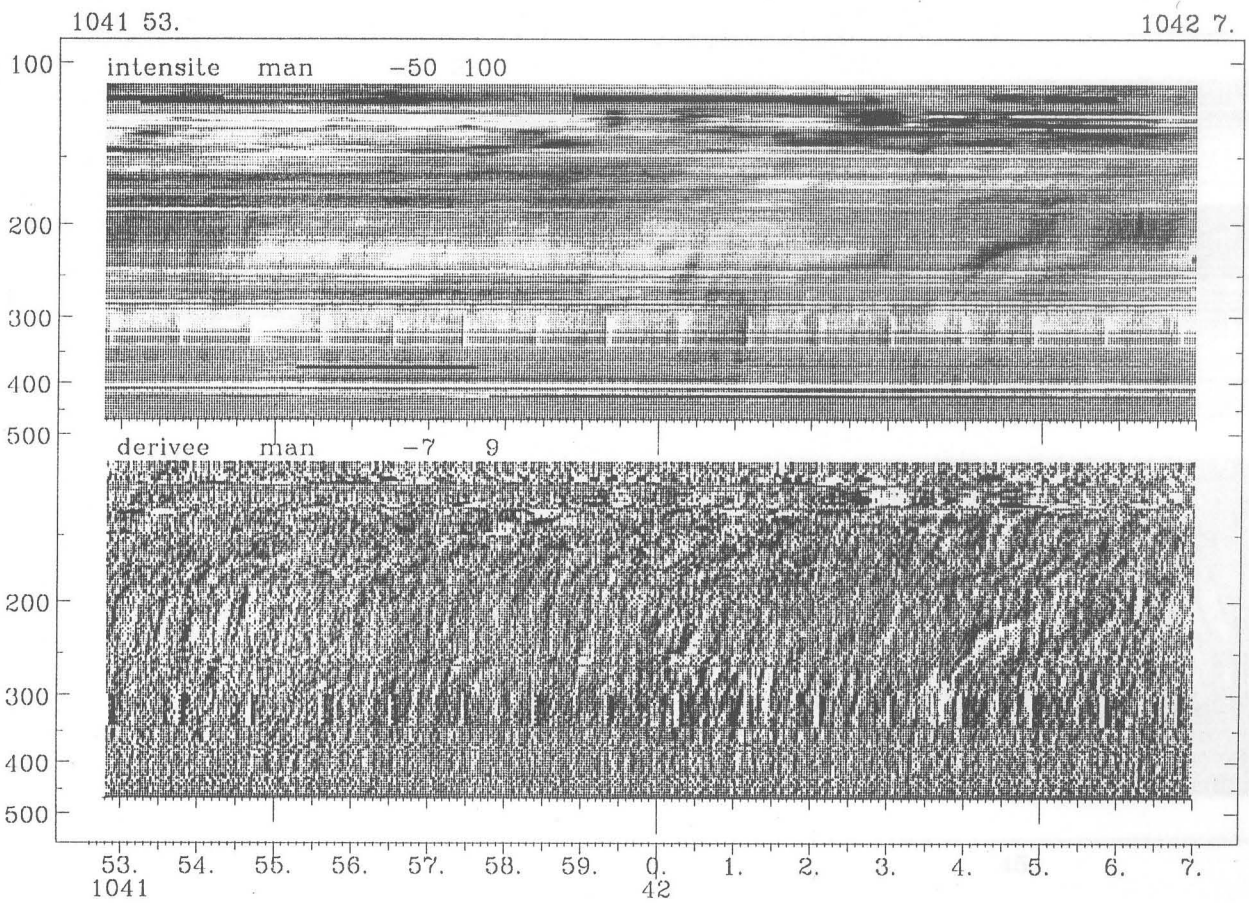
derivee man −7 9
100
200
300
400
500
38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52.
1041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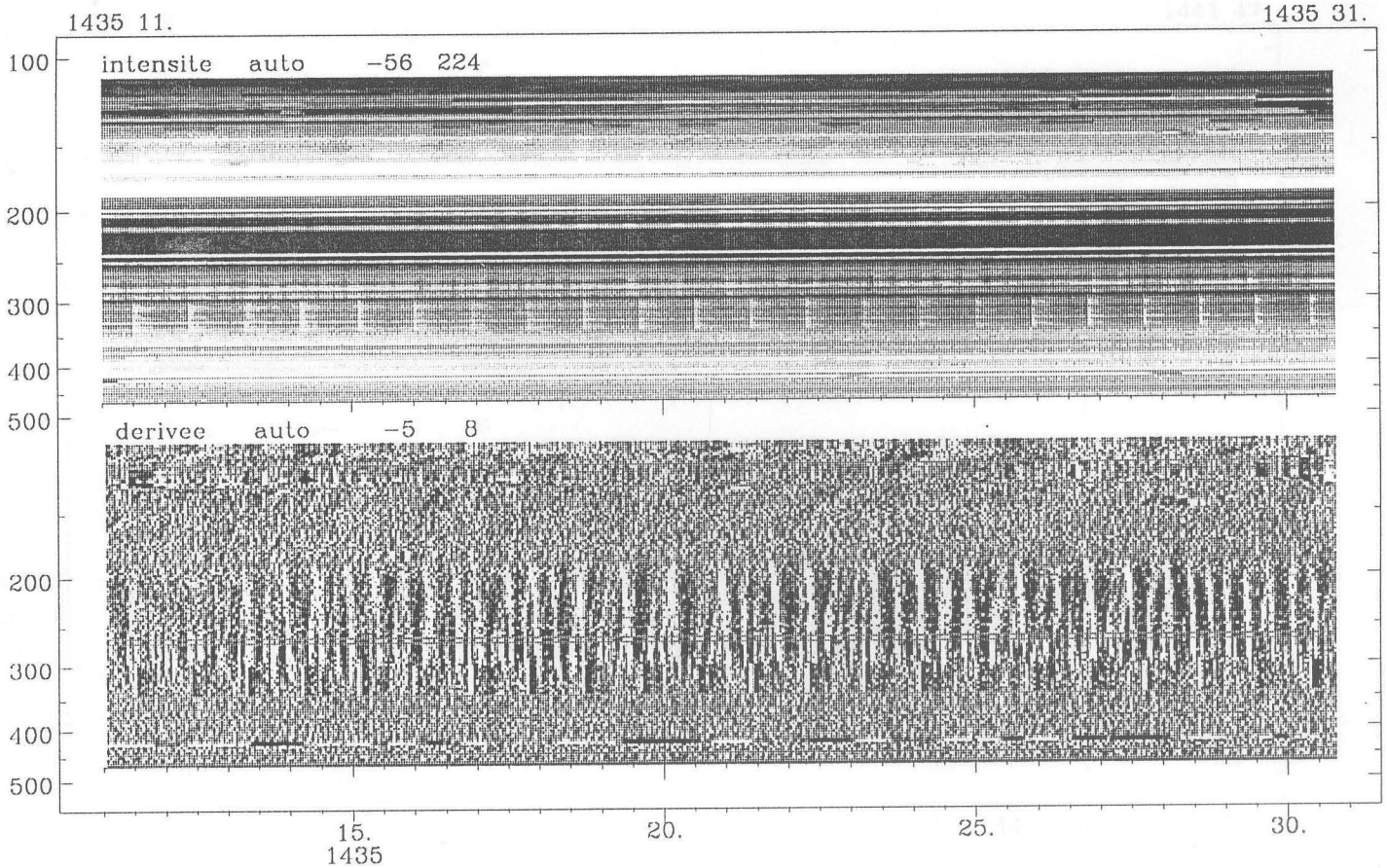
1041
42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1435
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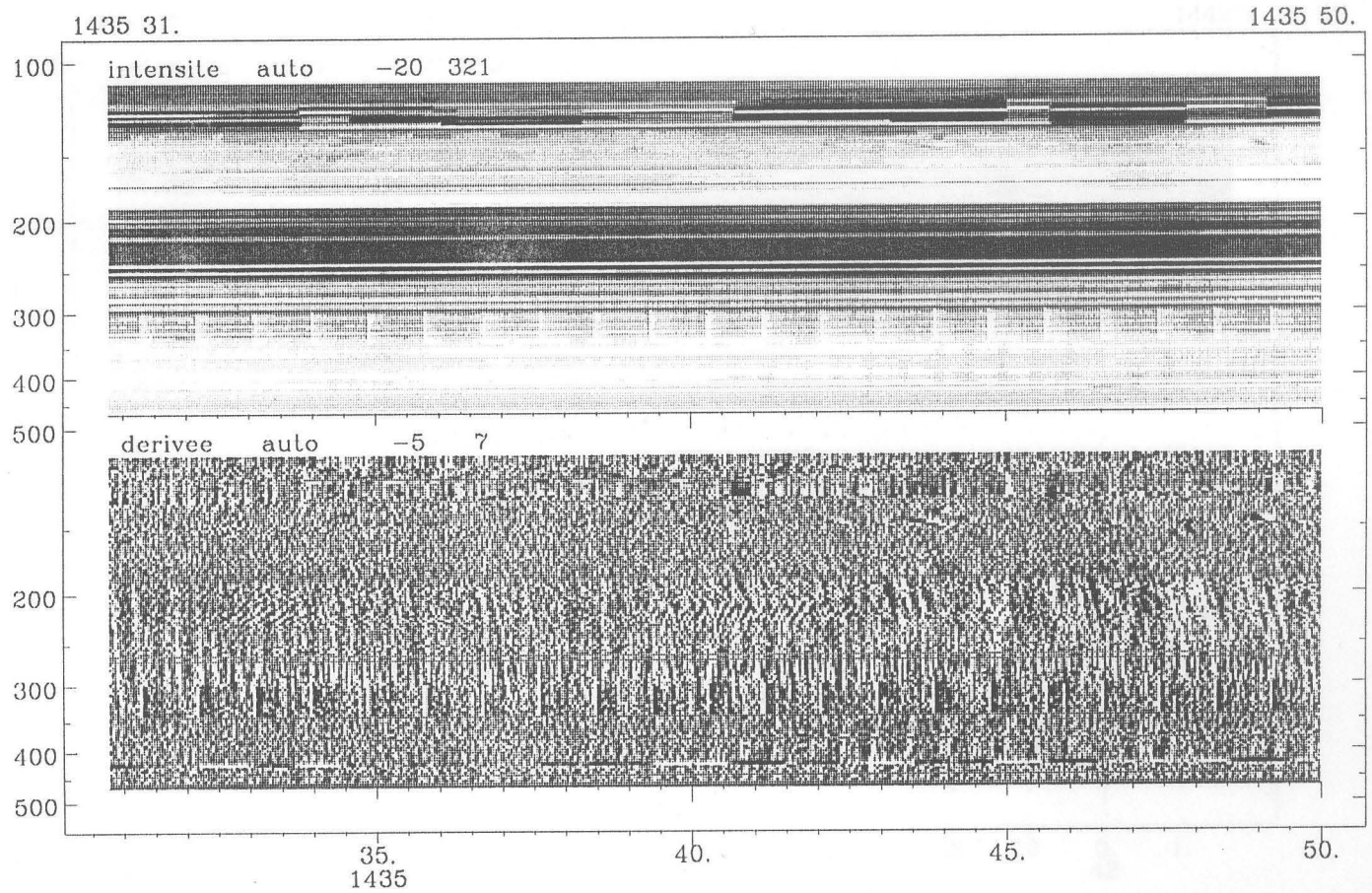
25.
30.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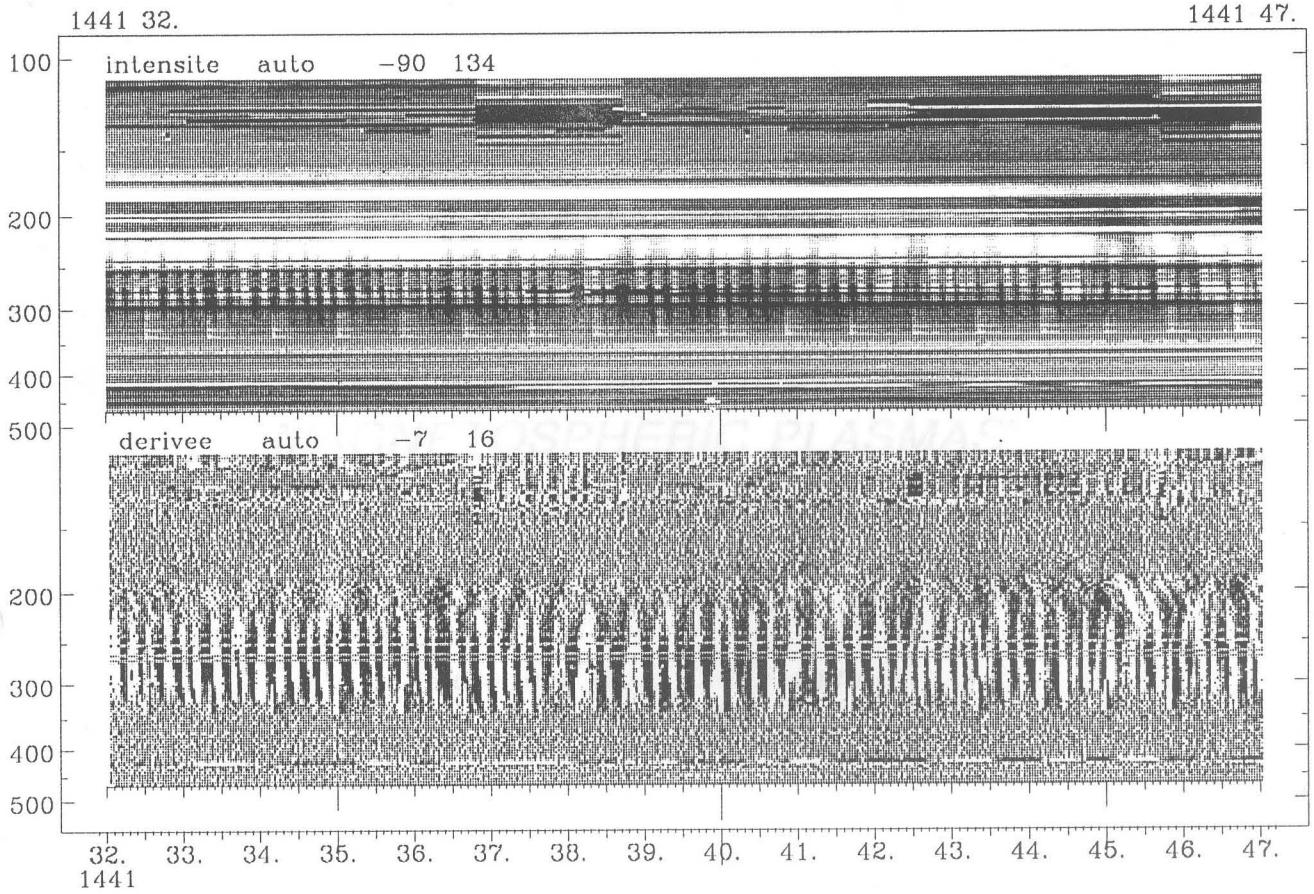
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300
400
500
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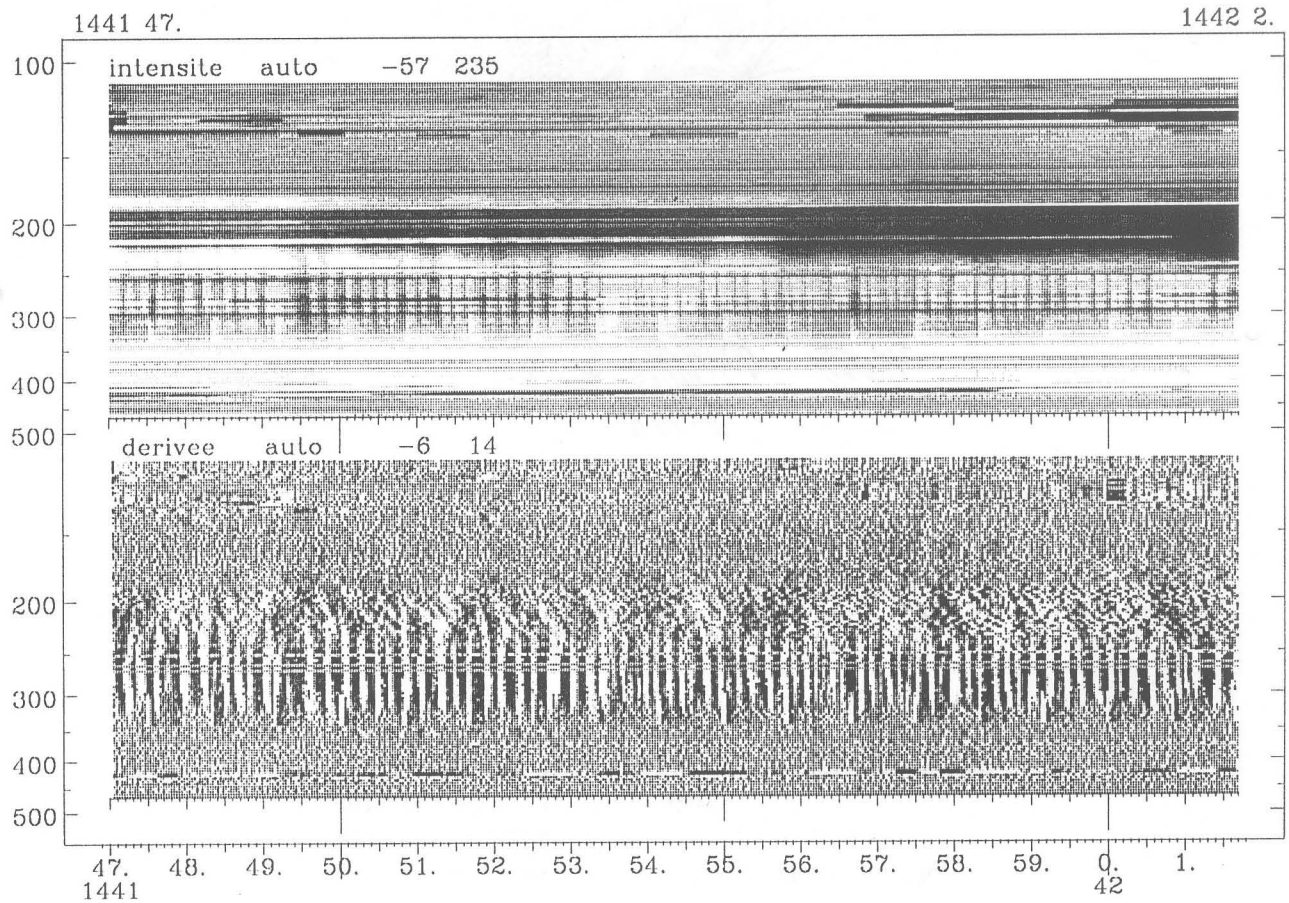
1441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1441
42