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METODS OF TESTING RADIATION OF PULSARS IN VIRTUAL LABORATORIES

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Abstract. The article describes methods for recording and studying signals from pulsating radio sources (pulsars) using virtual training observatories (VIREO) and determining the period and power of the pulsation.
Key concepts:pulsars, stellar physics, astronomical program, radiation sources.

Introduction

In 1946, J.Hay, S.Parsons, and J.Filmens were strong in the Swan constellationdiscovered a single source of radiation. This source is Swan A (Cyg A)began to be called [1, 89p]. (Sources of such radiation in each constellation after the category name, the letters A, V, S, ... and ect.). After that6 more such sources were discovered in two years. Radiation sourcesas a table in the Third Cambridge Catalog (referred to as 3C), compiled in 1959registered. To date, the number of such sources has exceeded 10,000gone [2, 29p].

The main results and findings

If some sources of radiation belong to our galaxy (e.g.αAldebaran's Crab Nebula), the rest are outside itbelongs to galaxies. However, most of them are irradiated in the radio rangethe total brightness is one thousandth, and it consists of heat radiation.The weakest sources of radiation are spiral (S) and irregular (Ir) galaxiesoutput and their radiation power in the decimeter range does not exceed 10^{-32} watts [10, 19p].The radiation of elliptical (E) galaxies is 100 times stronger in this range. Wide shell the radiation of elliptical galaxies surrounded by and separated into D-type is simpleis 100 times more powerful than galaxies. Swan A and another seriesthe radiation of galaxies is of an insensitive nature, i.e., severalintensity in their radio spectrum obtained from measurements in the range Rayleigh-Jeansnot with the formula$I(\nu) \approx H^{\frac{y+1}{2}} \nu^{\frac{y-1}{2}}$ is represented by the formula. Here H is the magnetic field strength, y-relativistic electron spectrumdegree indicator ($dN(E) = \frac{K}{E^y}$).Thusthese kind of galaxies work as a powerful accelerator[2, 32p], [9, 56 p].

Today, the development of modern telescopes and computers the increase in the capabilities of technology further distant universe objectscloser study, drawing the right conclusions and the knowledge gained from themallows to use in education[4, 46p]. This article

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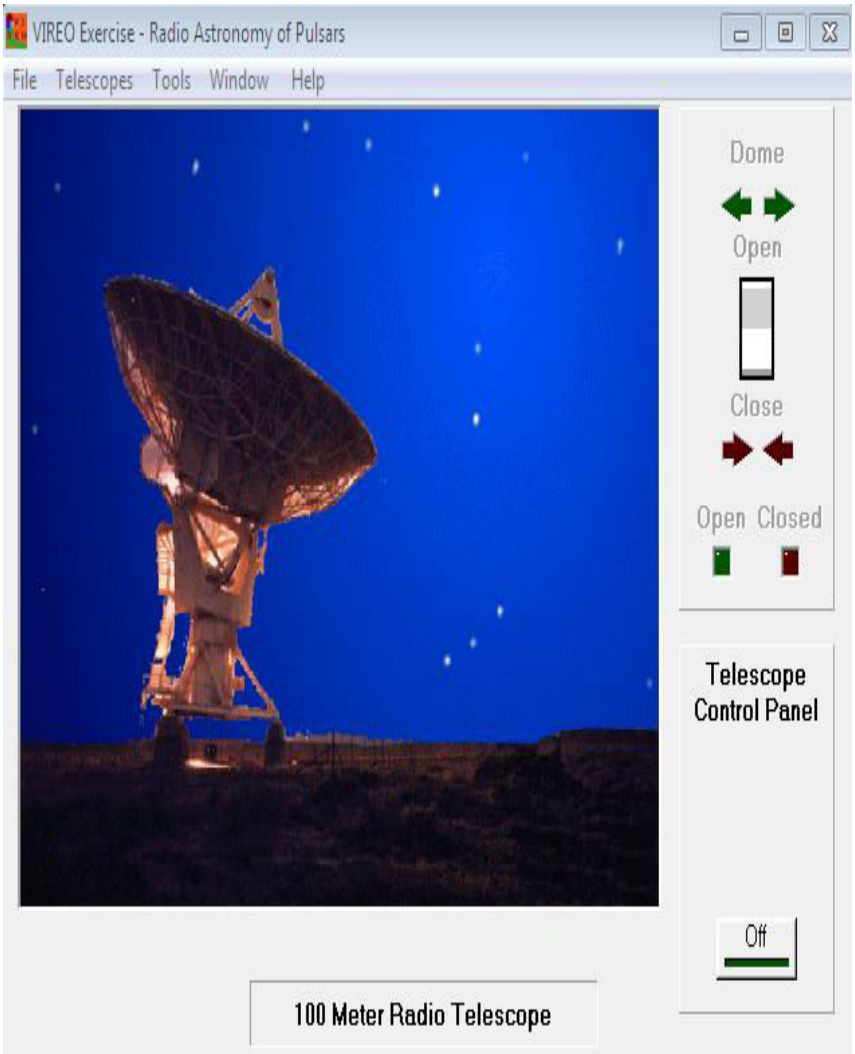
is one such caseto study existing radiation sources on the basis of virtual laboratorieswe focus[5, 87p].

The purpose of the work - sources of pulsating radiation (pulsars)from recording and studying signals as well as the pulsation period andpower determination[6, 19p].

A personal computer and a built-in "Virtual Learningobservatory "(VERIO Virtual Educational Observatory)Radio Astronomy of Pulsars will be needed [13].

Installing a virtual learning observatory on a computer. A virtual trainingIf the observatory program is not installed on the computer, the program firstis installed in the computer memory[7, 28p]. Then with the CLEA→VIREO buttonsfrom the folder where the program files are collected, press the CLEA_VERIO buttongo to the first page called PRODACTION OF CLEA. This is itfrom the top left of the page to a page called File→Login→Studentthe Accounting page can include up to four student names or pseudonyms. Then THE VIRTUAL OBSERVATORY a page called (Virtual Tracking) opens. File→Run Exercise from this page (context 6 work), Radio Astronomy Pulsars, and a page with the same name opens on the screen. In his place after a while a page with a black screen will launch. Telescopes→Radio context on this page is selected[3]. A page with the radio telescope antenna will open on the screen (picture1).



Picture 1. Access the home page to start the radio telescope.

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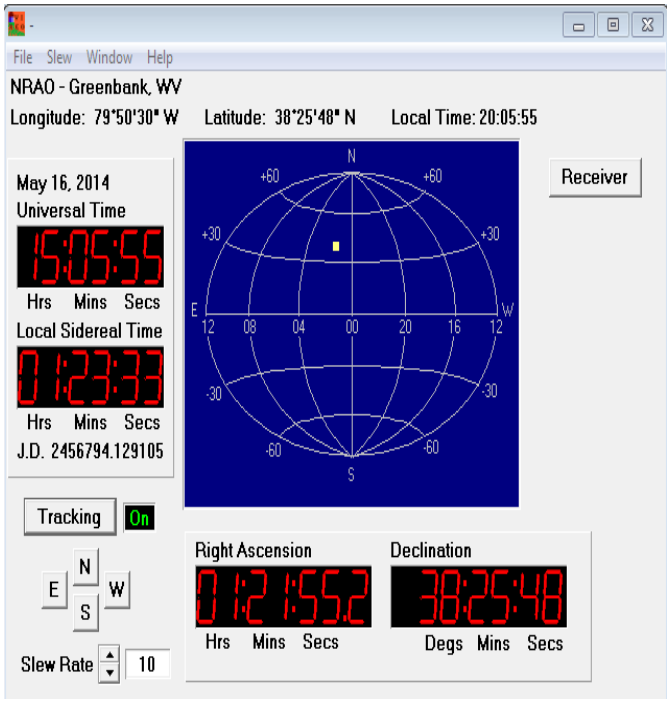
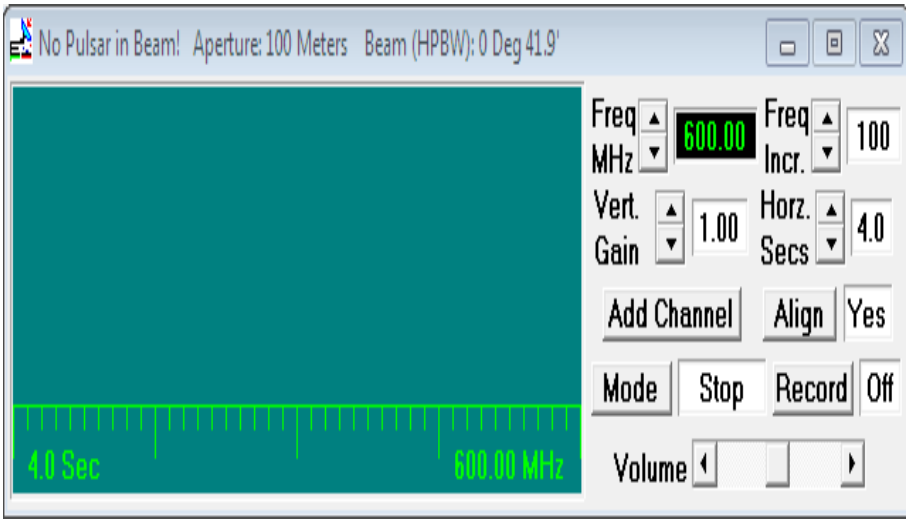
Use the "Off" button in the lower right corner of the pagewe open the page depicting the dome. Tracking at the bottom left of this page. Using the (observation) button andprepare the telescope for inspections (picture 2).



Picture 2. Preparing the telescope for inspections.

Recording quasar signals. To the right of the dome of the sky is the Receiver,at the top of the screen by confirming the buttona page is set up to record radio signals (picture 3).



Picture 3.Receiver for recording radio signals.

Inthe upper left corner of the page where the Sky Dome is listedPulsar Observation List in the context of Slew→Hot List→View / Select Hot List opens, about 8 pulsarsinformation is provided. The pulsar is selected from this page for observation (picture 4).

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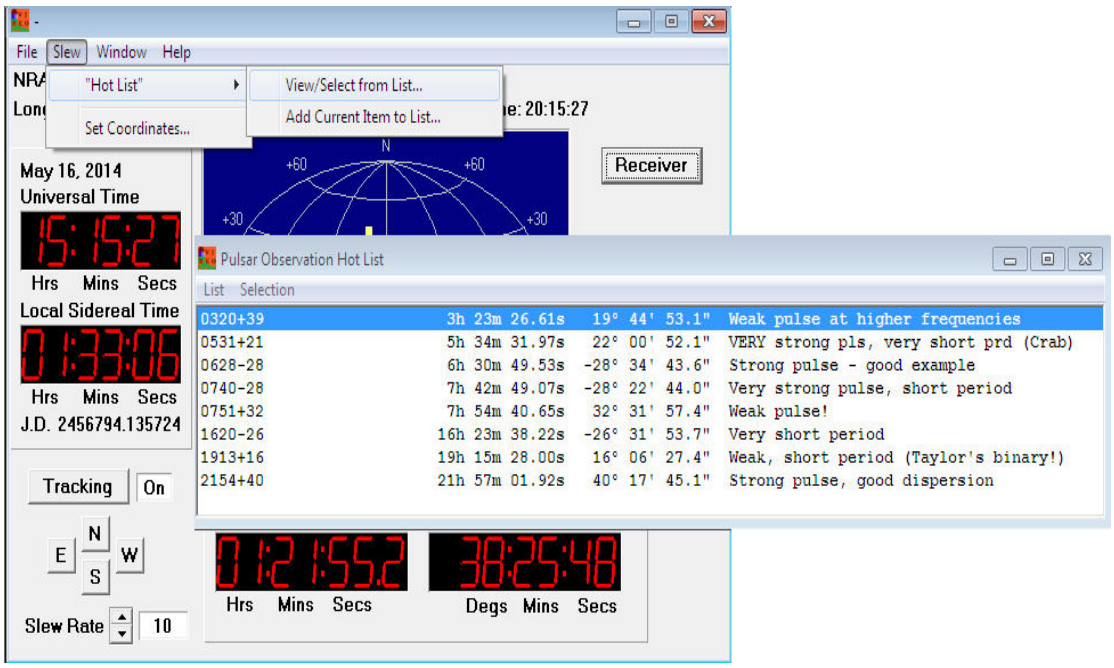
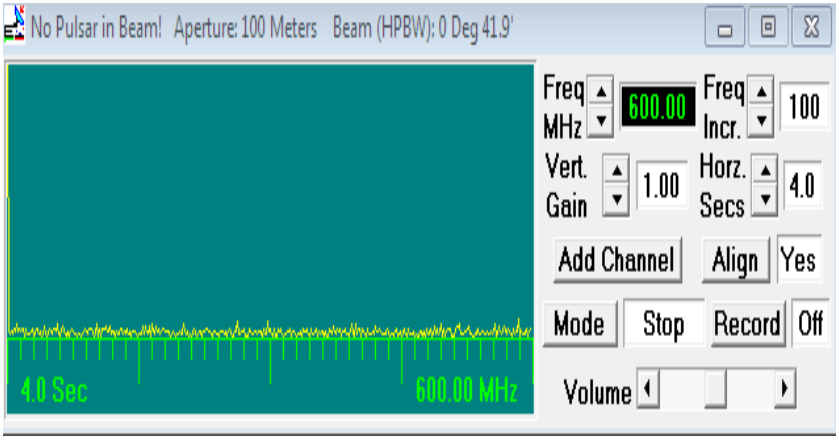


Picture 4.Select a pulsar from the list.

Then the radio telescope is directed to the pulsar by clicking the script "Enter Sky Coordinate for Slew"[8, 56p].

Receiver button on the top right of the sky domevia, a page will open to record the radio signals above, to its frequency of the received radio signal (in megahertz)given. The receiver can record signals in the range of 400 to 1400 megahertz. Ability to amplify (attenuate) the signal under the frequency notation .There is a button that gives a chance to amplify up to 0.13, 0.25,0.50, 1.00, 2.00, 4.00, 8.00 times.Underneath it is an "Add Channel", three at a time (for example, 400, 600,1400 megahertz) can be recorded on the channel. "Mode" under "Add Channel"the button activates the receiver (Picture 5).



Picture 5. Receiving signals from pulsars.

Once the radio signals are recorded, it is necessary to analyze them: this is the page for it to close and homepage Tools→Radio Pulsar Analysis will open a window of the same name through the context and save it to computer memorythe resulting records are output. The repetition of frequency and the power are obtained from these radio signal recordings (Picture 6).

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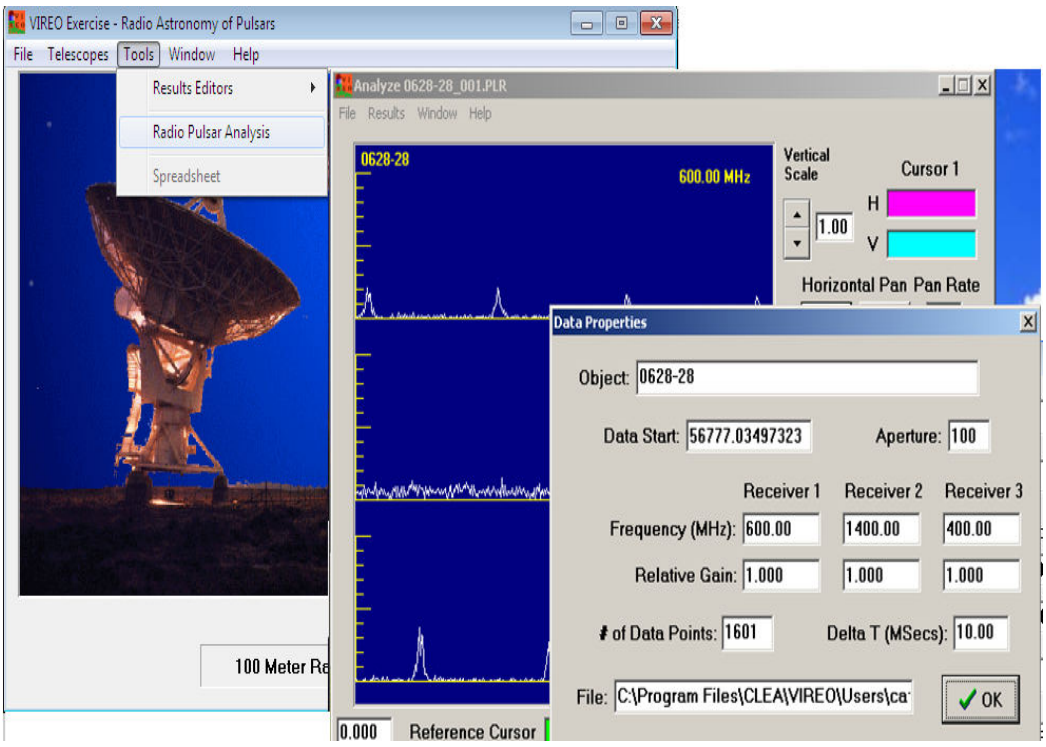

Picture 6. Recover and read records stored in computer memory.

Assignments for students to complete the work:

1. Prepare the radio telescope for measurement.
2. Set the radio telescope to measure the pulsar.
3. Determine the pulsation period and power of the pulsar.
4. Analyze records drawn at different frequencies and draw conclusions.

The results are recorded in the form of the following tableand analyzed.

The sign of pulsation	The period of pulsation	The power of pulsation	Shift at different frequencies

The report should also provide an analysis of the results obtained. Analyzes in the form of "SWOT" table or "Mental map"is advisable to have.

Sources of pulsating radiation by doing this(pulsars) from recording and studying signals as well as pulsationstudy of the method of determining the period and power [4, 41p]].

Conclusion

The conclusion is that the if the instructor is a creator and he is capable of using computer technology skills, then students can be the same with their instructor by attaining abovementioned competencies. At a high level of teacher trainingto try new ideas in the educational process.The Internet and computer technology will help us the mosttakes to do this. Thus, educators should utilize from the modern computer applications and different software .

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