

A background image showing the blurred silhouettes of a group of people walking away from the viewer towards a bright, glowing light source in the distance. The scene is bathed in a blue and white light, creating a sense of depth and movement.

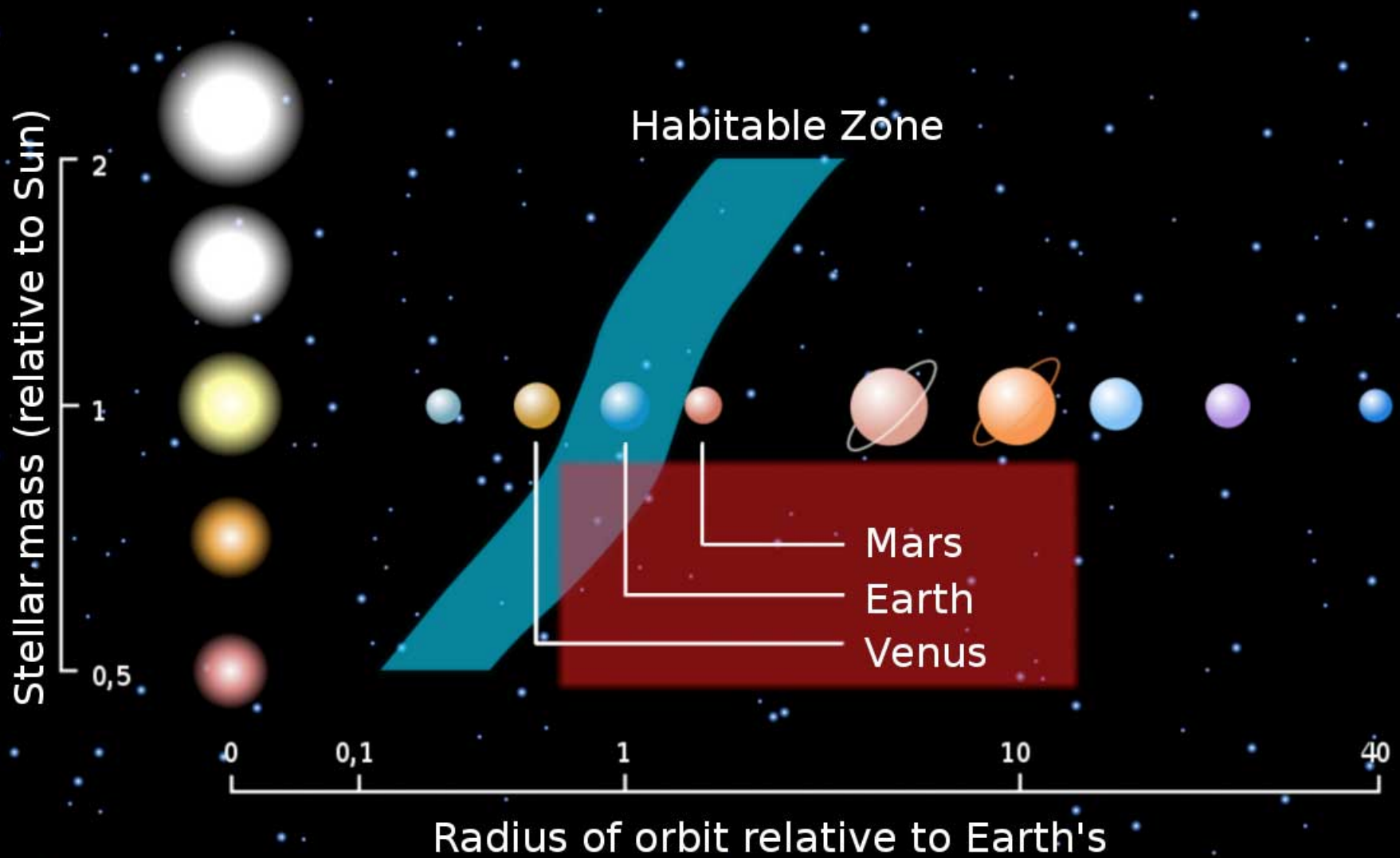
**Siamo soli nell'Universo ?**

**La ricerca della vita e la vita intelligente**

La “nostra” vita si fonda sul Carbonio. Probabilmente “qualsiasi” vita si fonda sul Carbonio...

Periodic Table of the Elements																18 VIIIA 8A	
1 1IA 11A																	2 He Helium 4.00260
1 H Hydrogen 1.0079	2 He Helium 4.00260																
3 Li Lithium 6.941	4 Be Beryllium 9.01218																
11 Na Sodium 22.989768	12 Mg Magnesium 24.305	3 IIIB 3B	4 IVB 4B	5 VB 5B	6 VIB 6B	7 VIIB 7B	8 VIII 8	9 VIII 8	10 VIII 8	11 IB 1B	12 IIB 2B	13 IIIA 3A	14 IVA 4A	15 VA 5A	16 VIA 6A	17 VIIA 7A	18 VIIIA 8A
19 K Potassium 39.0983	20 Ca Calcium 40.078	21 Sc Scandium 44.95591	22 Ti Titanium 47.88	23 V Vanadium 50.9415	24 Cr Chromium 51.9961	25 Mn Manganese 54.938	26 Fe Iron 55.847	27 Co Cobalt 58.9332	28 Ni Nickel 58.6934	29 Cu Copper 63.546	30 Zn Zinc 65.39	31 Ga Gallium 69.732	32 Ge Germanium 72.64	33 As Arsenic 74.92159	34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.80
37 Rb Rubidium 85.4678	38 Sr Strontium 87.62	39 Y Yttrium 88.90585	40 Zr Zirconium 91.224	41 Nb Niobium 92.90638	42 Mo Molybdenum 95.94	43 Tc Technetium 98.9062	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.9055	46 Pd Palladium 106.42	47 Ag Silver 107.8682	48 Cd Cadmium 112.411	49 In Indium 114.818	50 Sn Tin 118.71	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.90447	54 Xe Xenon 131.29
55 Cs Cesium 132.90543	56 Ba Barium 137.327	57-71 Lanthanide Series	72 Hf Hafnium 178.49	73 Ta Tantalum 180.9479	74 W Tungsten 183.85	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.9665	80 Hg Mercury 200.59	81 Tl Thallium 204.3833	82 Pb Lead 207.2	83 Bi Bismuth 208.98037	84 Po Polonium [208.9824]	85 At Astatine 209.9871	86 Rn Radon 222.0176
87 Fr Francium 223.0197	88 Ra Radium 226.0254	89-103 Actinide Series	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Uut Ununtrium unknown	114 Uuq Ununquadium [289]	115 Uup Ununpentium unknown	116 Uuh Ununhexium [289]	117 Uus Ununseptium unknown	118 Uuo Ununoctium unknown
Lanthanide Series			57 La Lanthanum 138.9055	58 Ce Cerium 140.115	59 Pr Praseodymium 140.90765	60 Nd Neodymium 144.24	61 Pm Promethium 144.9127	62 Sm Samarium 150.36	63 Eu Europium 151.9655	64 Gd Gadolinium 157.25	65 Tb Terbium 158.92534	66 Dy Dysprosium 162.50	67 Ho Holmium 164.93032	68 Er Erbium 167.26	69 Tm Thulium 168.93421	70 Yb Ytterbium 173.04	71 Lu Lutetium 174.967
Actinide Series			89 Ac Actinium 227.0278	90 Th Thorium 232.0381	91 Pa Protactinium 231.03588	92 U Uranium 238.0289	93 Np Neptunium 237.0482	94 Pu Plutonium 244.0642	95 Am Americium 243.0614	96 Cm Curium 247.0703	97 Bk Berkelium 247.0703	98 Cf Californium 251.0796	99 Es Einsteinium [254]	100 Fm Fermium 257.0951	101 Md Mendelevium 258.1	102 No Nobelium 259.1009	103 Lr Lawrencium [262]
			Alkali Metal	Alkaline Earth	Transition Metal	Basic Metal	Semimetals	Nonmetals	Halogens	Noble Gas	Lanthanides	Actinides					

## Un altro ingrediente che riteniamo essenziale: l'acqua allo stato liquido



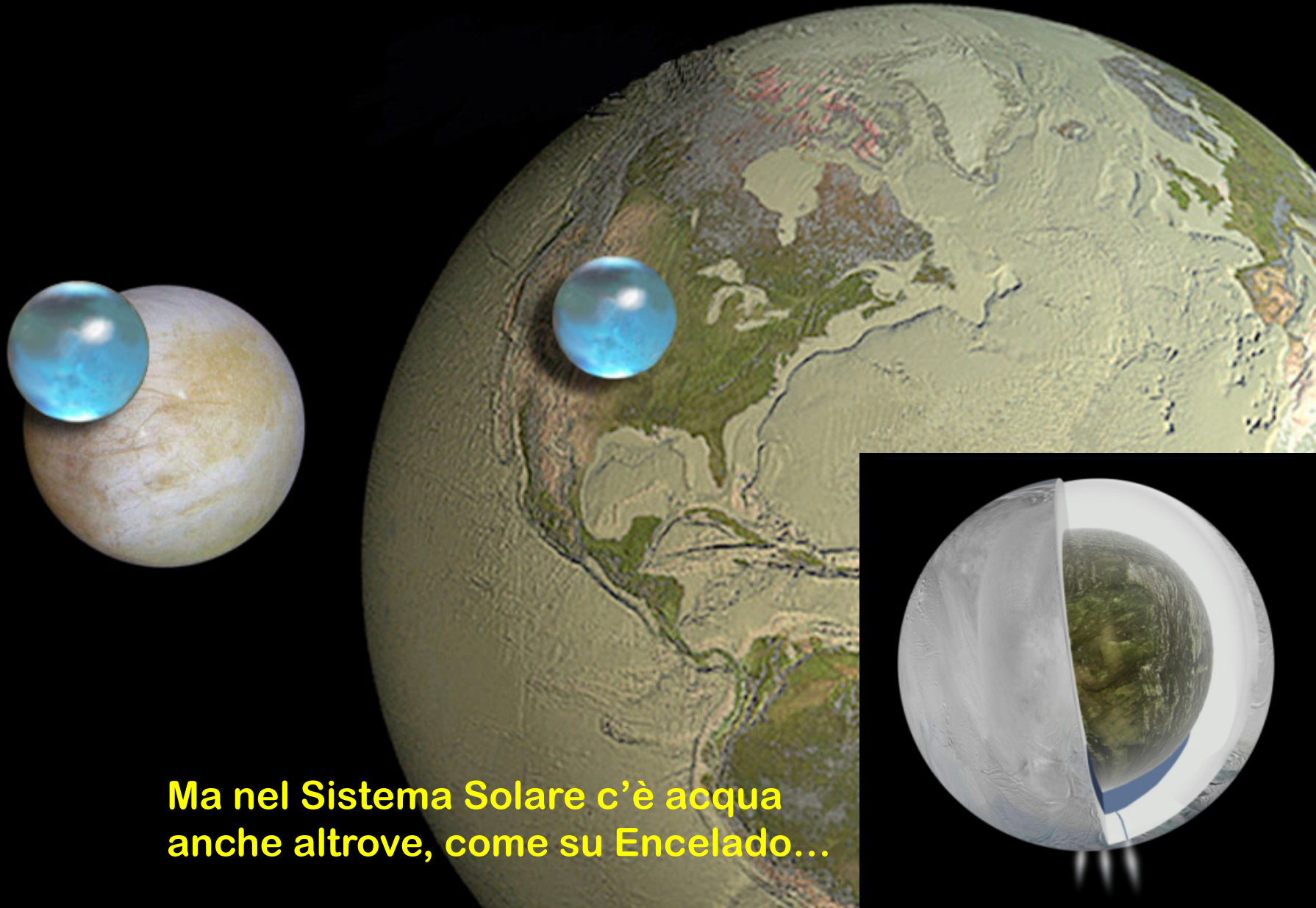
**Tracce di vita (per lo meno fossile) su Marte ?**



**Il meteorite marziano ALH 84001**

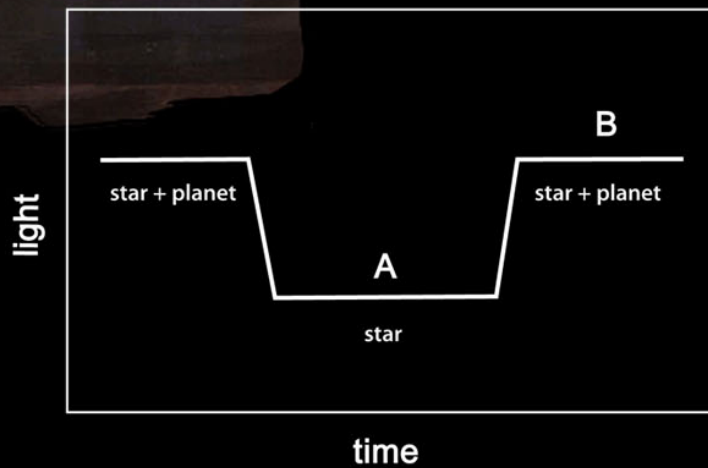
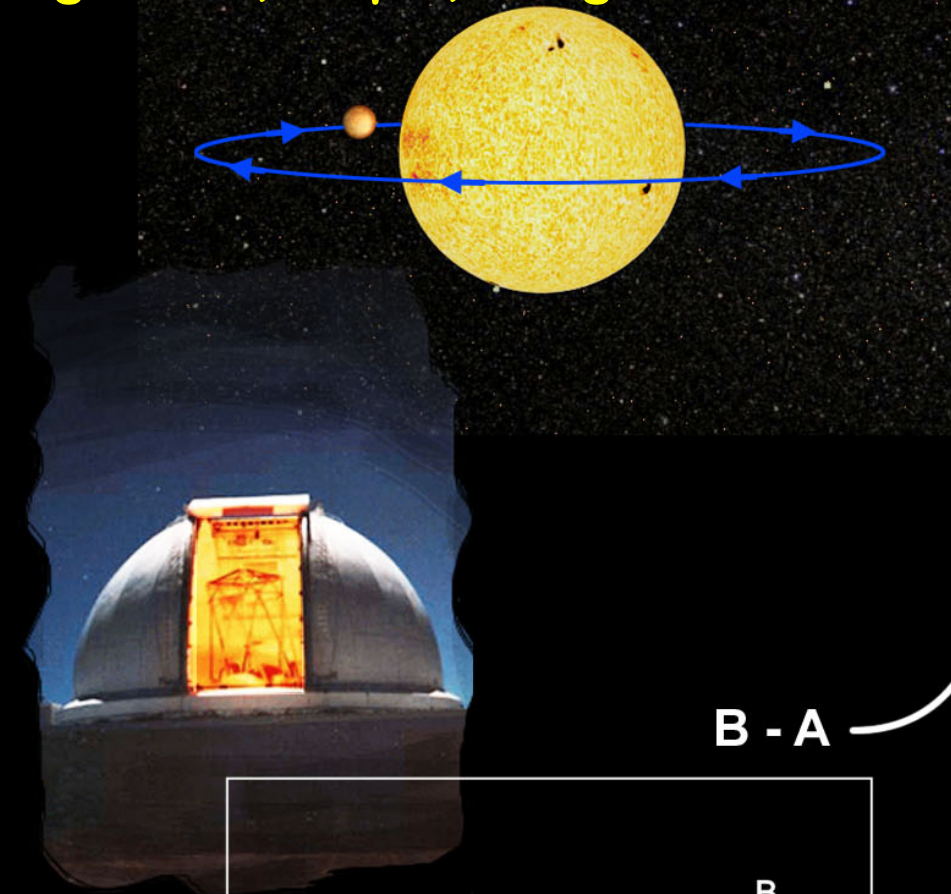


**Su Europa, molto probabilmente, c'è tanta acqua !...**

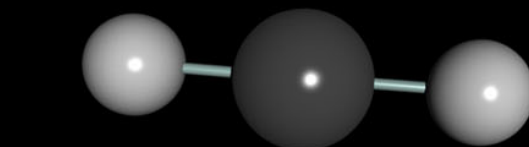
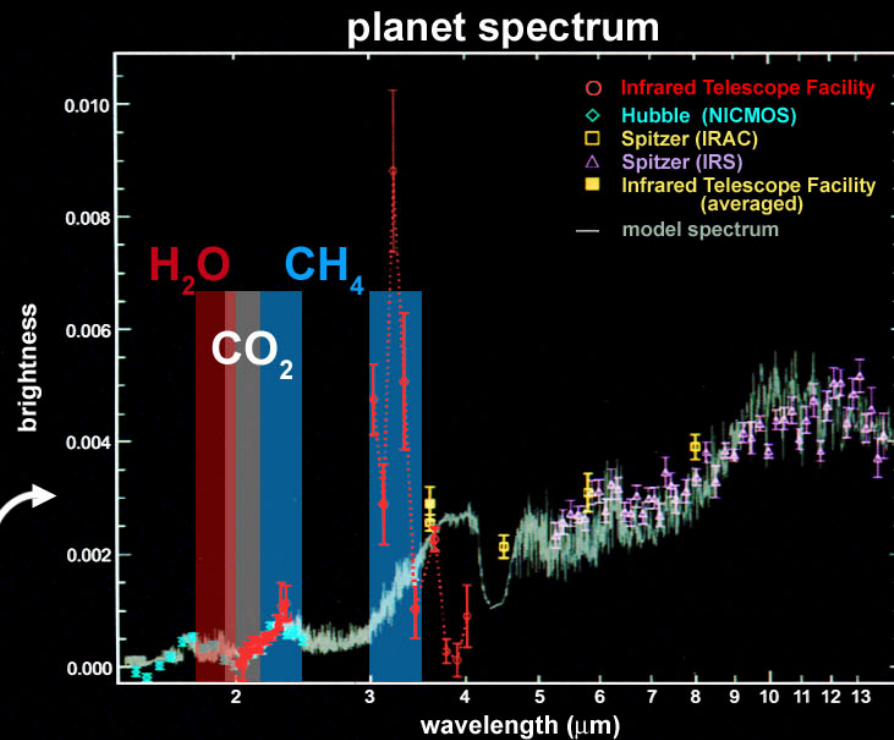


**Ma nel Sistema Solare c'è acqua  
anche altrove, come su Encelado...**

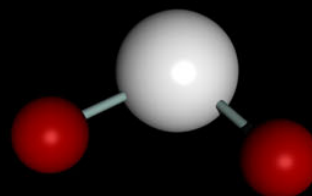
Nelle atmosfere degli esopianeti  
cerchiamo e cercheremo molecole  
organiche, acqua, ossigeno...



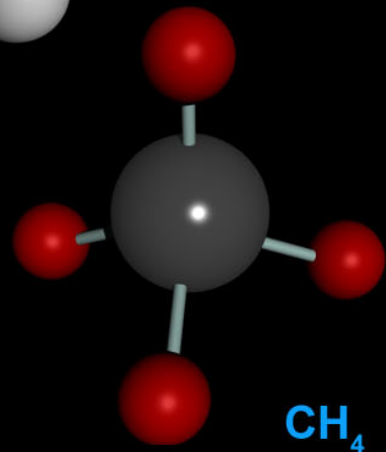
B - A



$\text{CO}_2$



$\text{H}_2\text{O}$



$\text{CH}_4$

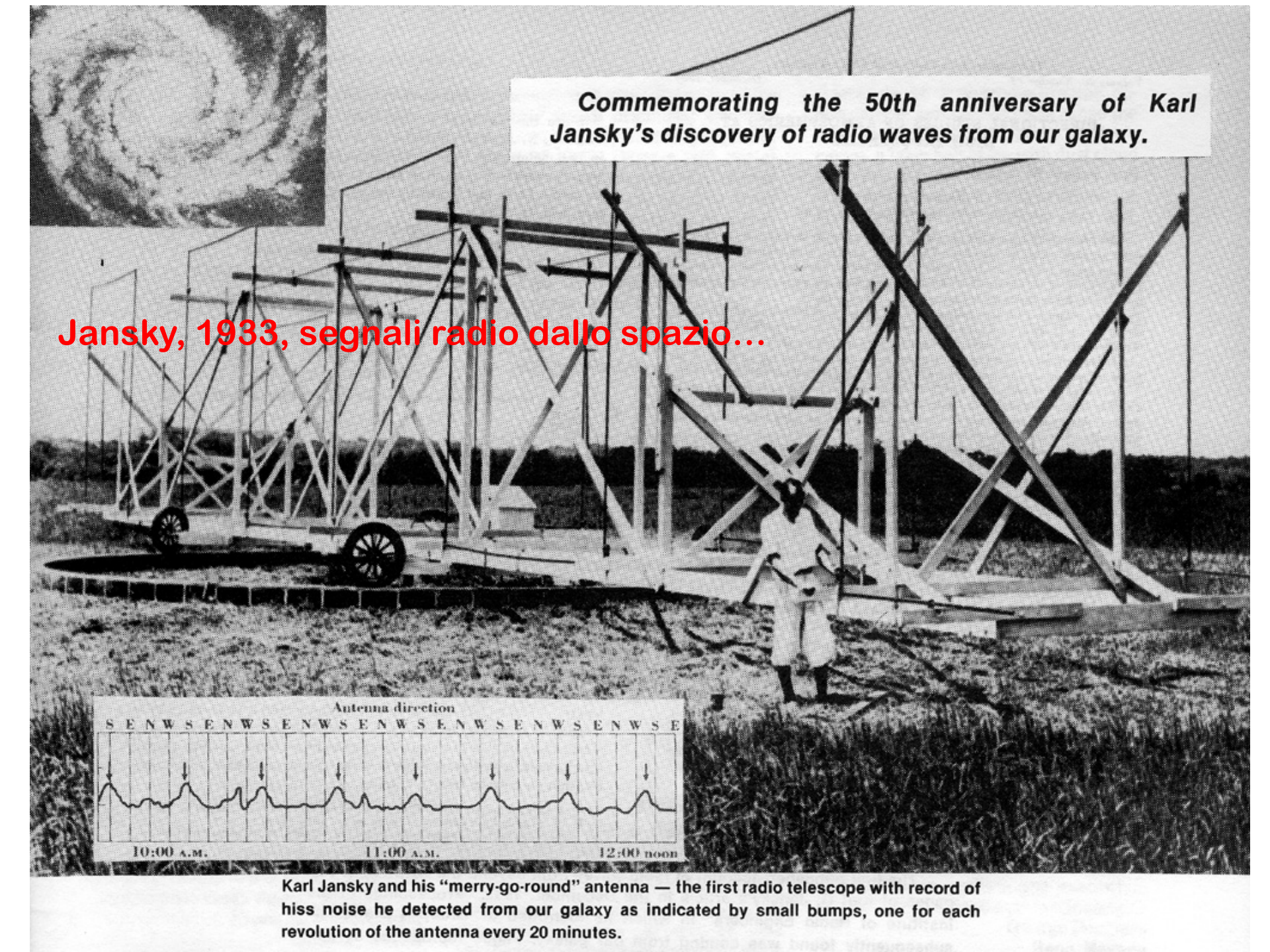


Ma oltre all'approccio Bottom-Up...



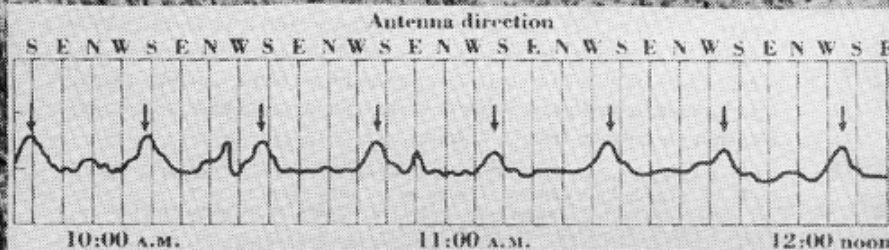
E' possibile un approccio Top-Down ?...





*Commemorating the 50th anniversary of Karl Jansky's discovery of radio waves from our galaxy.*

Jansky, 1933, segnali radio dallo spazio...



Karl Jansky and his "merry-go-round" antenna — the first radio telescope with record of hiss noise he detected from our galaxy as indicated by small bumps, one for each revolution of the antenna every 20 minutes.



Un articolo "storico" compare su Nature nel 1959...

## SEARCHING FOR INTERSTELLAR COMMUNICATIONS

By GIUSEPPE COCCONI\* and PHILIP MORRISON†

Cornell University, Ithaca, New York

**N**O theories yet exist which enable a reliable estimate of the probabilities of (1) planet formation; (2) origin of life; (3) evolution of societies possessing advanced scientific capabilities. In the absence of such theories, our environment suggests that stars of the main sequence with a lifetime of many billions of years can possess planets, that of a small set of such planets two (Earth and very probably Mars) support life, that life on one such planet includes a society recently capable of considerable scientific investigation. The lifetime of such societies is not known; but it seems unwarranted to deny that among such societies some might maintain themselves for times very long compared to the time of human history, perhaps for times comparable with geological time. It follows, then, that near some star rather like the Sun there are civilizations with scientific interests and with technical possibilities much greater than those now available to us.

\* Now on leave at CERN, Geneva.

† Now on leave at the Imperial College of Science and Technology, London, S.W.7.

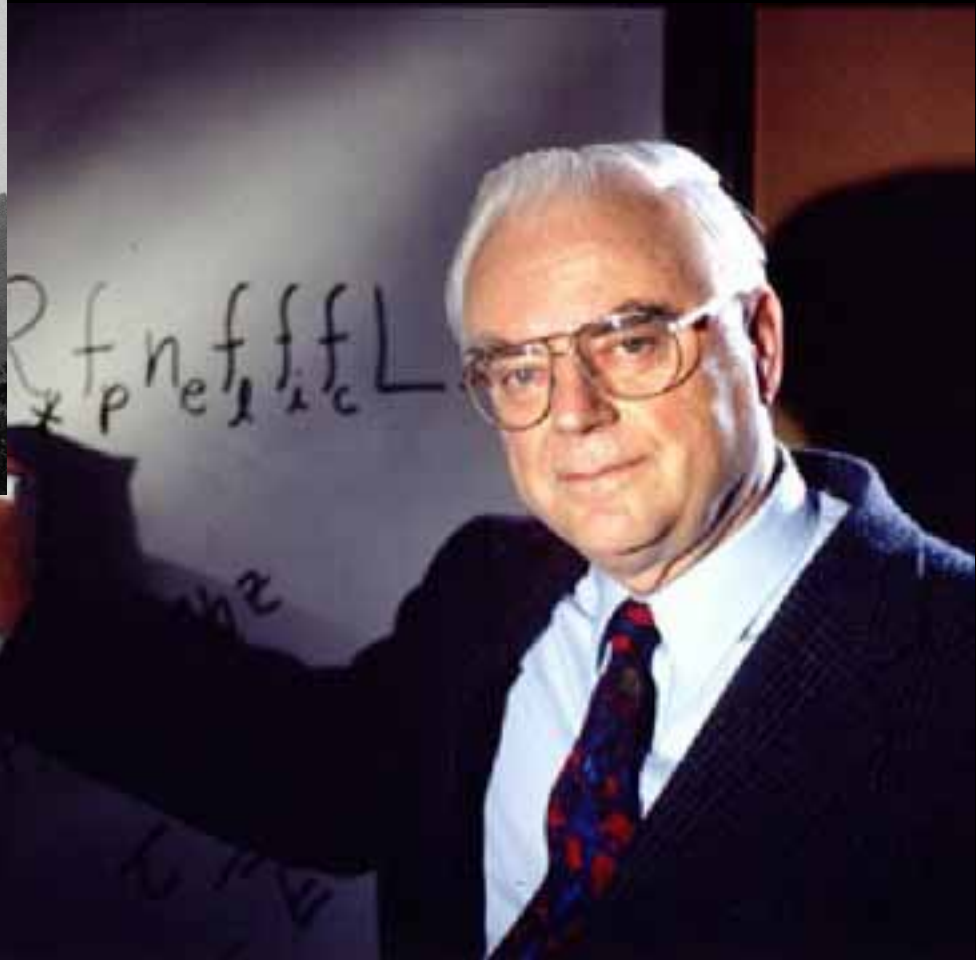
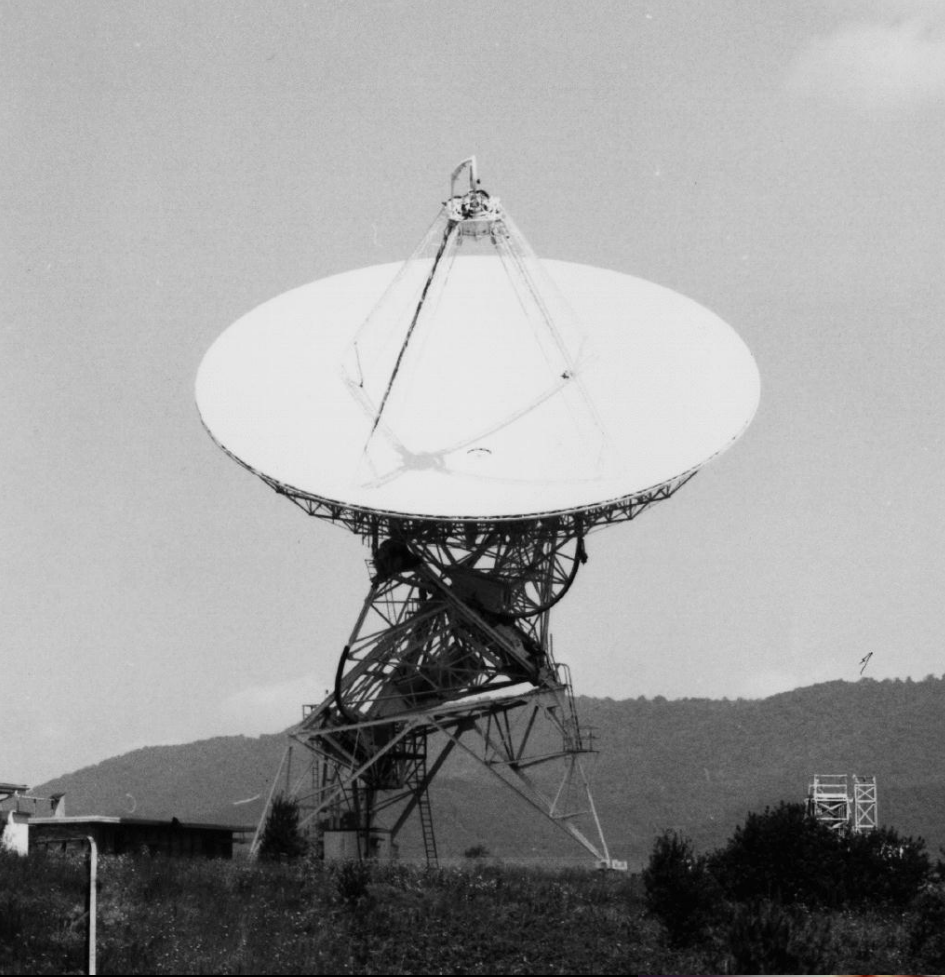
To the beings of such a society, our Sun must appear as a likely site for the evolution of a new society. It is highly probable that for a long time they will have been expecting the development of science near the Sun. We shall assume that long ago they established a channel of communication that would one day become known to us, and that they look forward patiently to the answering signals from the Sun which would make known to them that a new society has entered the community of intelligence. What sort of a channel would it be?

### The Optimum Channel

Interstellar communication across the galactic plasma without dispersion in direction and flight-time is practical, so far as we know, only with electromagnetic waves.

Since the object of those who operate the source is to find a newly evolved society, we may presume that the channel used will be one that places a minimum burden of frequency and angular discrimi-

**Nel 1960, Frank Drake, compie la prima “osservazione” alla ricerca di “segnali” extraterrestri....**





# The Drake equation

$$N = R_* f_p n_e f_l f_i f_c L$$

where:

**$N$**  = the number of civilization in our Galaxy with which radio-communication might be possible;

**$R_*$**  = the average rate of star formation in our Galaxy

**$f_p$**  = the fraction of those stars that have planets

**$n_e$**  = the average number of planets that can potentially support life per star that has planets

**$f_l$**  = the fraction of planets that could support life that actually develop life at some point

**$f_i$**  = the fraction of planets with life that actually go on to develop intelligent life

**$f_c$**  = the fraction of civilizations that develop a technology that releases detectable signs of their existence into space

**$L$**  = the length of time for which such civilizations release detectable signals into space

<http://seti.berkeley.edu>



**“Our group conducts experiments searching for electromagnetic signatures of intelligent extraterrestrial civilizations, spanning wavelengths from radio to visible light, over ten orders of magnitude in characteristic time scale.”**



**Per ora nessun segnale, ma...  
se le nostre attuali tecnologie fossero solo segnali di fumo ?...**

**- IO MI SON PRESO UN PORTATILE.**



**MASSY**



E gli UFO ?...



**UFO = Unidentified (Flying) Object**

**NON identificato NON significa (necessariamente) dischi volanti, astronavi, extraterrestri**

**Dischi Volanti → UFO**

**Ma NON è vero che**

**UFO → Dischi volanti**

**Non confondete le condizioni sufficienti con le condizioni necessarie !!**

**Non fatevi abbindolare da tutte le teorie su “complotti”, “segreti governativi” e misteri tenuti celati che si trovano in rete !!**