



كل شيء عن الشمس

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149,600,000	
152,100,000	
147,100,000	
8	
696,000	
1500	
30,000	
8,000	
25	
34	
16,000,000	
5,800	
4,500	
1,000,000	
$^{30}_{10} \times 1.99$	
G2	

(core)

25% (1)

16

150

(%34)

1882-) Arthur Stanley Eddington

(nuclear fusion) (1944)

1926 .1920

"The Internal Constitution of the Stars"

(plasma)

25%



$$E=mc^2$$

:

(1) %70 %25 (radiative zone)

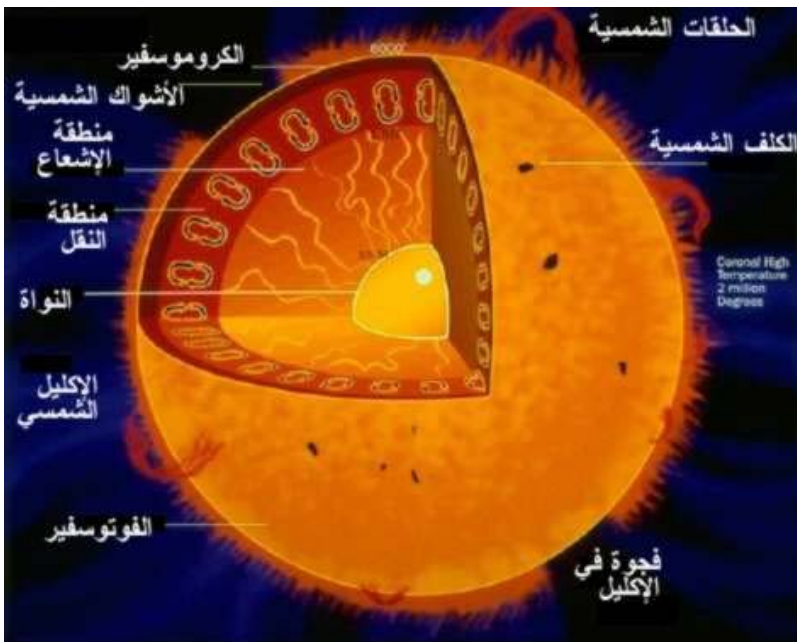
2 -1.5 8 %25

(radiation)

(10^{-6})

(200,000 -120,000) 170,000

170,000



(1)

:

(convection zone)
 .(1) %100 %70
 ()
 2 -1.5
 6,100

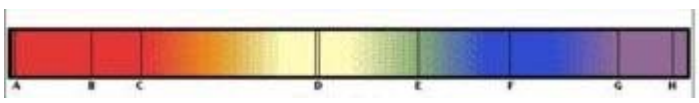
10 -5

:

(photosphere) ()
 5800 %0.03 200

%21 %79

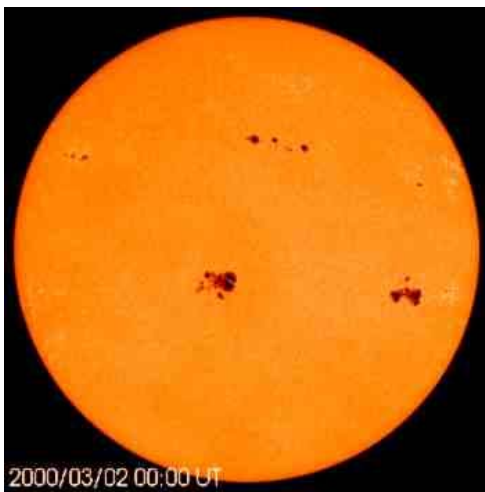
(2) Fraunhofer



) (2)
 (

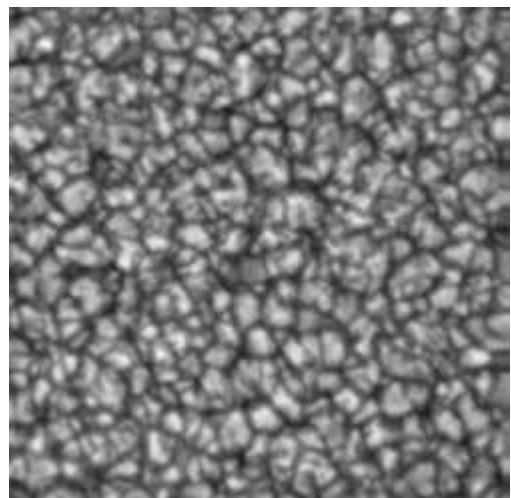
:(granules) .1

(granules) . (3)
 1500 - 1000 . (3)
 15 . 100
 : (super granules) .2
 30,000
 (sunspots) .3
 50,000 - 2,500 .(4)
 5,800 4,500
 25
 (differential rotation) 34



:(4)

4500



:(3)

2001

11

)

.2012

.(55

.(5)

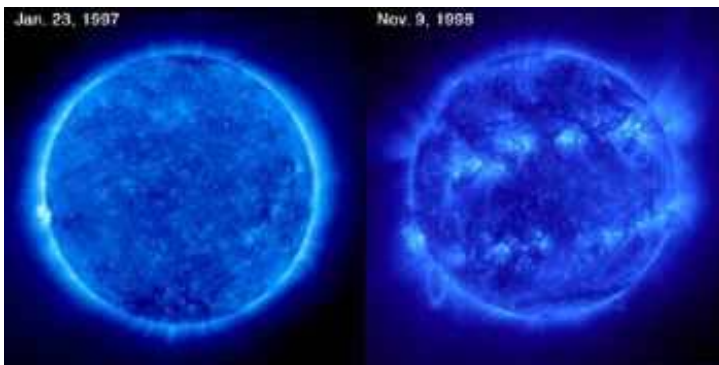
Babcock

.1961

11

()

.(active region)



() 1997

:(5)

.() 1998

:

(corona)	(chromosphere)		
	10,000	5,800	(solar wind)
			2 - 1

(6)

(1,000,000)

coronal)

(1) (holes

4 / 450



:(6)

:

:(spicules) .1

(6) 5

:(coronal loops) .2

(7)

50,000

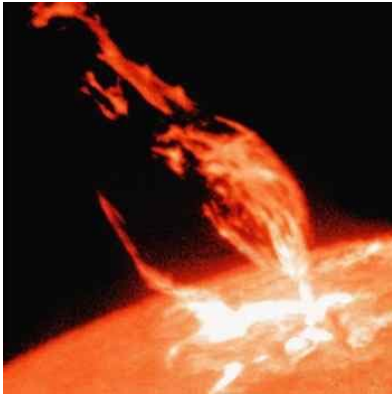
:(prominences) .3

3 - 2

:(flares) .4

1% (8).

5



(8):

(7):

(9) (aurora).



(9):