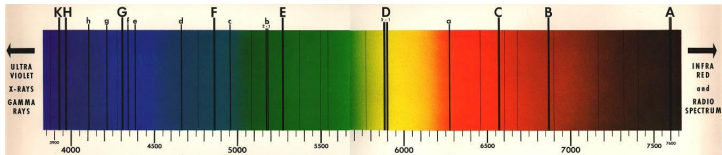


# JFS-2. Netiešie mērījumi.

Linards Kalvāns

Latvijas Universitāte  
Fizikas un matemātikas fakultāte

2012. gada 18. februāris.  
Rīga, Latvija

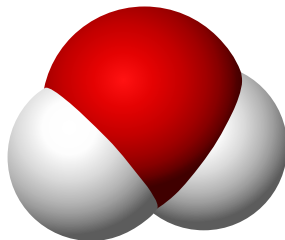
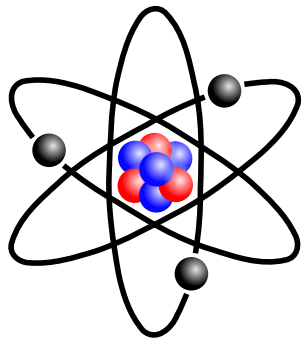


# No kā sastāv viela?

Atomi? Molekulas? Vai kāds ir redzējis **vienu** atomu?  
Un **vienu** molekulu?

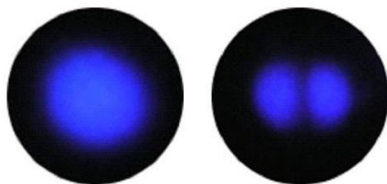
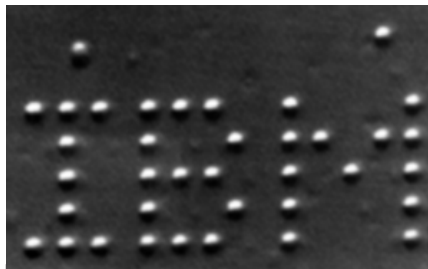
# No kā sastāv viela?

Atomi? Molekulas? Vai kāds ir redzējis **vienu** atomu?  
Un **vienu** molekulu?



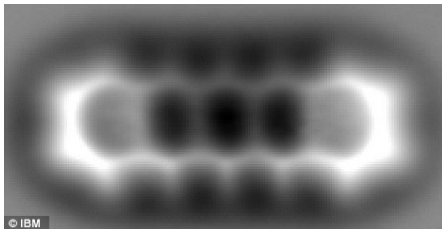
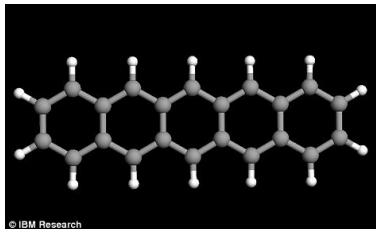
# No kā sastāv viela?

Atomi? Molekulas? Vai kāds ir redzējis **vienu** atomu?  
Un **vienu** molekulu?



# No kā sastāv viela?

Atomi? Molekulas? Vai kāds ir redzējis **vienu** atomu?  
Un **vienu** molekulu?



$i$	$h_i$ , mm	$(h_i - \bar{h})$ , mm	$(h_i - \bar{h})^2$ , mm <sup>2</sup>	$d_i$ , mm	$(d_i - \bar{d})$ , mm	$(d_i - \bar{d})^2$ , mm <sup>2</sup>	$(h_i - \bar{h})(d_i - \bar{d})$ , mm <sup>2</sup>
1	69			22			
2	61			27			
3	61			28			
4	67			24			
5	62			25			
6	66			23			
7	66			25			
8	62			24			
9	62			27			

$i$	$h_i$ , mm	$(h_i - \bar{h})$ , mm	$(h_i - \bar{h})^2$ , mm <sup>2</sup>	$d_i$ , mm	$(d_i - \bar{d})$ , mm	$(d_i - \bar{d})^2$ , mm <sup>2</sup>	$(h_i - \bar{h})(d_i - \bar{d})$ , mm <sup>2</sup>
1	69	5		22	-3		
2	61	-3		27	2		
3	61	-3		28	3		
4	67	3		24	-1		
5	62	-2		25	0		
6	66	2		23	-2		
7	66	2		25	0		
8	62	-2		24	-1		
9	62	-2		27	2		

$i$	$h_i$ , mm	$(h_i - \bar{h})$ , mm	$(h_i - \bar{h})^2$ , mm <sup>2</sup>	$d_i$ , mm	$(d_i - \bar{d})$ , mm	$(d_i - \bar{d})^2$ , mm <sup>2</sup>	$(h_i - \bar{h})(d_i - \bar{d})$ , mm <sup>2</sup>
1	69	5	25	22	-3	9	
2	61	-3	9	27	2	4	
3	61	-3	9	28	3	9	
4	67	3	9	24	-1	1	
5	62	-2	4	25	0	0	
6	66	2	4	23	-2	4	
7	66	2	4	25	0	0	
8	62	-2	4	24	-1	1	
9	62	-2	4	27	2	4	



$i$	$h_i$ , mm	$(h_i - \bar{h})$ , mm	$(h_i - \bar{h})^2$ , mm <sup>2</sup>	$d_i$ , mm	$(d_i - \bar{d})$ , mm	$(d_i - \bar{d})^2$ , mm <sup>2</sup>	$(h_i - \bar{h})(d_i - \bar{d})$ , mm <sup>2</sup>
1	69	5	25	22	-3	9	-15
2	61	-3	9	27	2	4	-6
3	61	-3	9	28	3	9	-9
4	67	3	9	24	-1	1	-3
5	62	-2	4	25	0	0	0
6	66	2	4	23	-2	4	-2
7	66	2	4	25	0	0	0
8	62	-2	4	24	-1	1	2
9	62	-2	4	27	2	4	-4

# Kovariācija

$s^2(h)$	$c(h, d)$	=	$9$	$-4.9$
$c(d, h)$	$s^2(d)$		$-4.9$	$4$

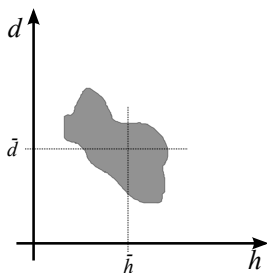
$$c(h, d) < 0$$

$$c(h, d) \approx 0$$

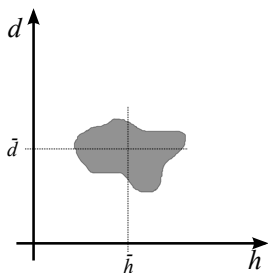
$$c(h, d) > 0$$

# Kovariācija

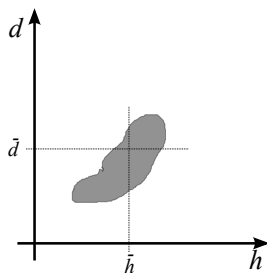
$s^2(h)$	$c(h, d)$	=	$9$	$-4.9$
$c(d, h)$	$s^2(d)$		$-4.9$	$4$



$c(h, d) < 0$

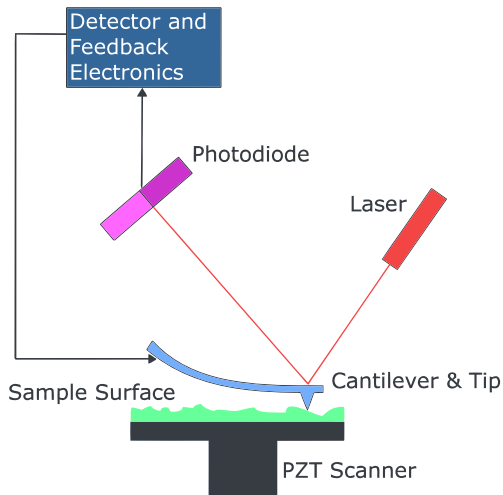


$c(h, d) \approx 0$

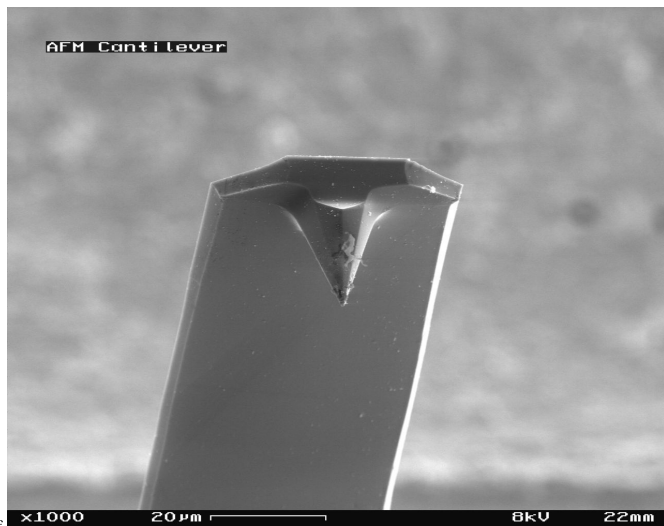


$c(h, d) > 0$

# Atomu spēku mikroskops



# Atomu spēku mikroskops



# Atomu spēku mikroskops

