

[Redacted]

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 a r r , r r , b r l , a l l r , l a t  
 b a t , a a t t a t . a r r t a r a a t -  
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I





...  $\square$ a<sup>t</sup> l a a a l a<sup>t</sup> ba a<sup>t</sup> a<sup>t</sup> a<sup>t</sup> **[30]**. Ba a<sup>t</sup> b a a  
b a a<sup>t</sup> a<sup>t</sup> a<sup>t</sup> a<sup>t</sup> a<sup>t</sup>  $\square$  a<sup>t</sup> a<sup>t</sup> 3D a a l a a<sup>t</sup> : (1) b -  
a<sup>t</sup> (2) a<sup>t</sup> r a<sup>t</sup> . B a a<sup>t</sup> a<sup>t</sup> a<sup>t</sup> a<sup>t</sup> a<sup>t</sup> a<sup>t</sup> a<sup>t</sup>  $\square$  a<sup>t</sup>  
a<sup>t</sup> b<sup>t</sup> a a<sup>t</sup> a<sup>t</sup> b<sup>t</sup> a<sup>t</sup> . I a<sup>t</sup> b a a a<sup>t</sup> , a a<sup>t</sup>  
a a<sup>t</sup> a<sup>t</sup> a<sup>t</sup> b a a a a a a a a<sup>t</sup> (F. **[24.1]**).  
E a a<sup>t</sup> a<sup>t</sup> a<sup>t</sup> a<sup>t</sup> , a a a a a a<sup>t</sup> (I.,  $\square$  $\square$  $\square$ )  
a<sup>t</sup> a<sup>t</sup> a<sup>t</sup> a<sup>t</sup> a<sup>t</sup> a a a a l , a<sup>t</sup> a<sup>t</sup> a a a a a<sup>t</sup>  
a<sup>t</sup> a<sup>t</sup> **[31]**. I a a a<sup>t</sup> a<sup>t</sup> , b a a a<sup>t</sup> b a a a a a a<sup>t</sup>  
a a a a b a<sup>t</sup> a a a<sup>t</sup> a<sup>t</sup>  $\square$  l a<sup>t</sup> . La<sup>t</sup> , a a a<sup>t</sup>  
a a a a a a a a a a<sup>t</sup> (F. **[24.1]** a<sup>t</sup>). F a<sup>t</sup> a<sup>t</sup> a<sup>t</sup> a<sup>t</sup> a<sup>t</sup> 3D  
l a a a a a a a a a a<sup>t</sup> a a b a a a a a a  
S a a<sup>t</sup> a a a a b a l a a a a a a a a a  
a a a a a a . F a a a , a a a a a a a a -  
a<sup>t</sup> a<sup>t</sup> b a a a a<sup>t</sup> , a a a a -Da b a a a<sup>t</sup>  
( $\square$ DCK) a a a a a a a a a a a a a a a  
a a a a a a a a a a<sup>t</sup> I a<sup>t</sup> **[32, 33]**.









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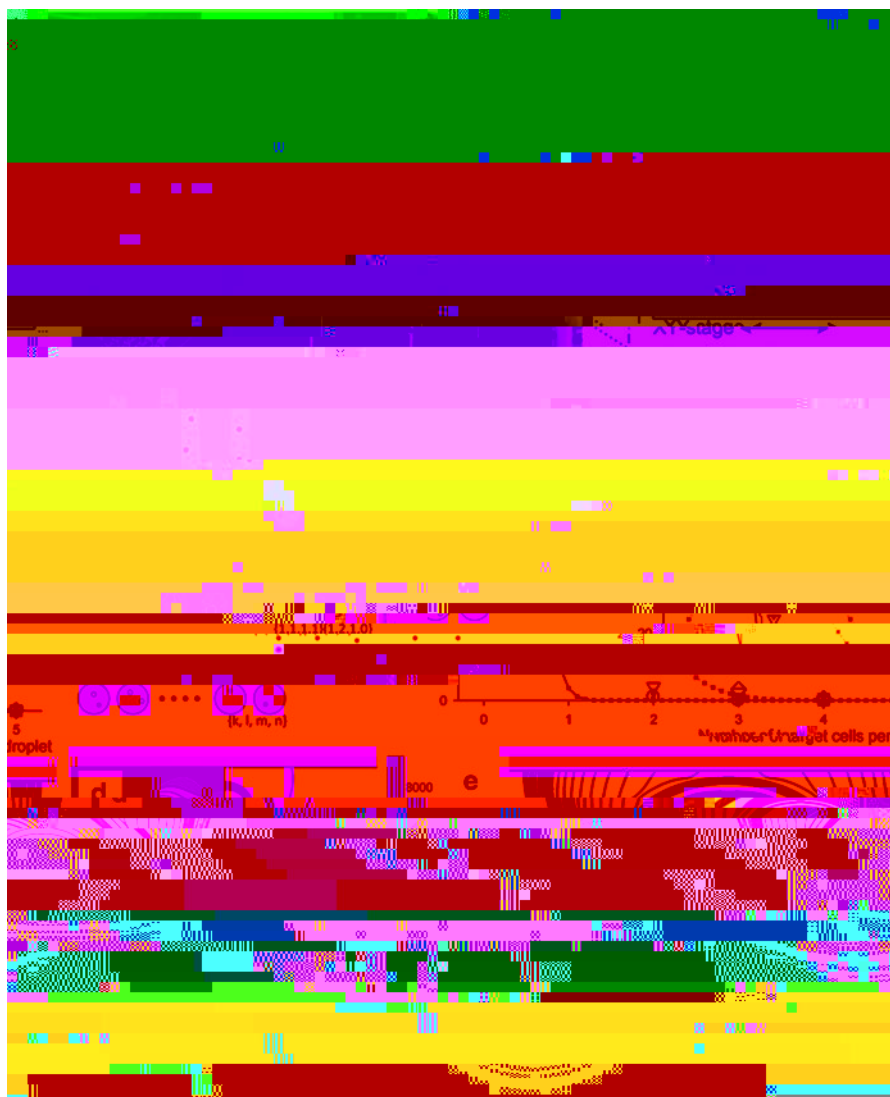
4.	l a t b a t t l t a	S a t	R a t r	S a t ( )	R t ( )
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W V	a a (B16 F10)	F b a t a	G t , l t a	9 (FSK-1); 5	S t a . 173]
W V	H a t a (FSK-1; K S42; 87)	l a t a - -	t a b	(K S42); 1 3 (87)	a t a . 174]
W V	a a (MHCC97H)	l a a	t a a a	8 10	
W V	O a a (O - L12B);	t a a a t l	a a	4	G r t a . 153]
W V	a (B L67)	H - S a	t a a		
W V	a b a t a	F a a	t a a a	1 3.5	B t a . 175]
W V	a a (B16 F10)	F a a	t a a t a	5.8	a a t a . 176]
W V	H a t a (L C C)	I a - a t	t a t a t	2	R t a . 177]

4. C i a  $\downarrow$  3D a r h t l C t ab

a t a i t  a t a i t

r i r t a  r i r t a





**4.** Simulation results for a system of interacting particles. The top panel shows a heatmap of the system's state. The middle panel shows a schematic of a cell with a nucleus (blue) and cytoplasm (red), with a troplet of particles (green) and a nucleus (blue) labeled with  $(i, l, m, n)$ . The central plot shows the distribution of  $X$  values, with a peak around 1.5. The bottom panels show various plots and diagrams related to the simulation, including a plot of  $P(x)$  and a diagram of a cell with a nucleus and cytoplasm.

Figure 4. Simulation results for a system of interacting particles. The top panel shows a heatmap of the system's state. The middle panel shows a schematic of a cell with a nucleus (blue) and cytoplasm (red), with a troplet of particles (green) and a nucleus (blue) labeled with  $(i, l, m, n)$ . The central plot shows the distribution of  $X$  values, with a peak around 1.5. The bottom panels show various plots and diagrams related to the simulation, including a plot of  $P(x)$  and a diagram of a cell with a nucleus and cytoplasm.

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 83, 84]. a a a a a  
 85]. a b b a a a a b a  
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 t t l a t t l a t a t t a l  
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 r a t t 114, 120, 121]. C a t a . 122] a r a 2D t  
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 a l t 3D t r . I t t a t , a a l t a t t  
 t a t t a t t b a t a 2D a 3D  
 a t t a a t a t a a b t l a t 123].  
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C... a 2D a... b... a... a...  
 a... 3D... a... a... 151, 152]. Ca...  
 2D... 3D... a... a... 153],

at ab at a ta  
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1. G b a 2008 (2010) I at a A a Ca (IA/C), H a O a at // b a a / a / a a ? =900
2. B J, a D (2001) at Ca 1(1):46
3. Ha a a D, b A (2000) a a a C 100(1):57 70
4. A b B, J A, L J, a b K, (2002) a b a ,4t Ga a S
5. J a A Ka a (2000) at ta t a a C L S 57(1):5 15
6. Ca G, at -V a b B, S D (1995) I a t - I a a a a a B C 84(1 2):53 61
7. K b F a J (2002) C a t a at a b a at Ca 2(10):727 739
8. H t ba G (2004) O t t a a t a t a t a I : S a E ,31(3):21 27
9. Abb t A (2003) C : b a . 424(6951):870 872
10. F, a -V, O La ab CA, D a S, B a L , B (1998) a a t b t a l- t a a a t a a b a t a : a b a t a a S 95(25):14821 14826





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- 248.
48. J (2013) C a b t a t : ASA b a -
- // . a a / a / t a / a / t /CBOSS-01-C . t
49. a S (2008) a a a t a 3- b a .
- I : E-G ( ) B t a a , 14. E ,
- A t a , 275 296
50. B t C K SJ (2002) b a t a t a : a t -ba . a . t a -
- B t B t B t 80(4):465 476
51. Ba a J, a t AL, C abb A, Sa SF, H b t-K a t O t C , CA
- (2010) O t a 3 : t t t a t a t t t t t t
- a t t a t . a t b 8(11):791 801

53. Gr B, B a E, S a J, JF, Ja b II, Ga SA, Da, r D (2009) -  
a b C  
42(2):219 228



- 95. a E, ba D (1987) a :GD a t -  
S 238(4826):491
- 96. a GS, D S, a H, a a A, Q, b B S  
(2004) A ta t a a a b a t b a  
a b t t a t t . S C 22(6):1030 1038
- 97. K a J, J K, B, H H, S C, a S, G AJ (2002) S  
a b t t t t t t t t t t a a a t t t a  
: a t a t t t a A a S 99(15):9996 10001
- 98. Da E, t t a a DA, a a a , Ha , D, Ka D, a S, L  
(2005) I tab a b t t t a b a t t a a a  
t t a . C a t 111(4):442 450
- 99. H A, a , G a F, a S (2007) B t a t t a b t t t .  
a





- 160. Ha JD, L SL (2008) A t a t a t a a t a a a a a a
- E S-FLI l a t . C C 7(2):250 256
- 161. BA (2009) A t a t a t a t a t a t a . B a a
- 77(11):1665 1673
- 162. Ba t a a a A a a t , H, b t A (2005) A a | -
- b a t a t a t a t a t a a a a a t a a | -
- t t a t a t a t a a t a a t t a
- a a | . J B S 10(7):705 714
- 163. a a a a a a a a a a a a a a a a a a a
- t t a t a t a t a t a t a t a t a t a t a t a