Supplemental Information

Growth-and-Collapse Dynamics of Small Bubble Clusters Near A Wall

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Arrangement A			Arrangement B		
x (mm)	y (mm)	z (mm)	x (mm)	y (mm)	z (mm)
-1.086836	0.689173	-1.024553	-1.025854	0.597152	0.292199
-2.367571	-1.281840	3.589808	-3.329176	1.136410	0.460673
-3.661258	-4.868838	-1.622075	-4.867184	1.138743	-3.848681
-1.931421	-0.985416	5.652233	-1.042292	0.325168	3.967223
-4.785294	0.636287	0.064156	-1.768032	-5.631457	-0.640963
-1.885370	-2.381264	-0.481226	-5.355006	1.188808	0.856156
-1.110226	-2.291957	-4.706053	-3.051651	1.713072	3.918957
-2.209516	1.014170	5.394270	-3.243492	-4.163419	-1.433412
-1.372657	-4.929850	0.851532	-2.309864	1.329732	-1.573699
-5.314615	0.642289	-3.438534	-2.680362	2.169451	-3.470404
-2.736749	4.039751	-2.467888	-4.113917	-0.864378	-1.441598
-1.134484	0.804616	-4.338246	-2.773029	-4.955946	2.133865
-3.444904	0.332877	-2.691925	-1.682376	-1.286627	1.008094
-1.488035	1.662933	2.789523	-3.136402	-3.103409	2.922667
-5.299482	-1.089539	1.179641	-4.375106	3.520721	-1.334330
-1.298281	-0.877510	1.085704	-1.425108	4.296104	-3.444544
-4.043875	-1.597892	-1.050671	-3.286204	-3.468501	-3.779071
-4.352587	2.238476	1.945842	-2.758607	-0.821597	5.554301
-1.178886	-3.861257	-2.243984	-1.147344	3.561551	1.141706
-5.882439	0.485350	2.388231	-1.423824	-4.998291	-3.671132
-1.447131	-4.591041	3.242370	-5.417658	0.700687	-1.671082
-3.336262	-1.041263	0.755701	-2.500932	-1.313393	-4.965392
-4.511158	-1.673325	4.156348	-1.096053	2.602783	4.620531
-4.208337	2.480724	-2.880547	-2.311438	5.442386	-1.556710
-2.173839	3.744195	3.606787	-3.029472	-1.423919	-3.028656
-2.623093	2.132962	0.497280	-1.657068	-2.790654	-2.098797
-3.637898	5.094763	0.666160	-3.932265	-2.747164	1.018104
-1.959615	5.813372	-0.774004	-5.017970	-0.623531	2.542517
-3.218766	-2.630871	-3.474723	-1.903634	0.923346	-5.441145
-3.946817	1.222129	3.932966	-1.347166	-3.085465	-5.311293
-3.369430	-0.774688	-5.207717	-1.151900	-3.991158	4.717736
-2.503334	2.055689	-1.703054	-1.523446	5.960278	0.869485
-4.134656	-3.297280	1.934555	-2.313194	3.817550	3.022540
-1.755276	-3.065508	4.693913	-1.670914	1.659796	1.921853
-1.440827	3.953303	-0.253241	-2.778200	-0.383989	3.195630
-5.764873	2.469881	-0.308948	-3.623605	5.116382	1.059723
-5.254612	-2.930658	-0.009048	-5.216182	-2.199783	-2.591223
-1.047282	-1.127636	-2.707068	-1.610142	-3.648347	-0.215130
-1.277922	2.775056	-3.948091	-5.559343	-0.982882	0.229753
-5.004160	-1.782155	-2.831330	-4.711215	3.595206	2.173660
-3.582637	1.453562	-4.539342	-1.196679	-2.268830	3.281457
-1.812641	5.006654	1.954683	-1.175062	2.779312	-0.742784
-6.196743	-1.037085	-0.714041	-1.837841	3.089366	-5.112517
-1.348730	-5.881095	-1.883898	-4.101476	-1.985212	4.281609
-1.725683	-2.597173	2.073078	-1.036527	0.048177	-3.474658
-2.299649	-4.490142	-3.801999	-1.134382	0.897094	6.175811
-3.016148	-5.161372	2.062628	-1.394477	-0.783256	-1.164002
-4.421427	4.254605	-1.408623	-4.512662	0.166093	4.380083
-1.259840	2.828885	5.376202	-3.081793	3.235950	0.284282
-1.231422	5.143116	-3.478384	-1.099171	-3.817647	1.913919

TABLE 1. Initial bubble-center coordinates for arrangements A and B. The first row is the centermost bubble.

Arrangement C			Arrangement D		
x (mm)	y (mm)	z (mm)	x (mm)	y (mm)	z (mm)
-1.130368	-1.910057	-0.486667	-1	0	0
-1.347649	3.135913	1.577115	-3.770163	2.782929	3.301894
-4.073435	-2.970037	-3.129806	-1.816968	-3.287415	-0.818264
-4.206148	-2.05289	1.623391	-2.160684	3.221941	-4.070333
-2.791085	2.985814	4.378397	-2.072842	5.591209	-0.076946
-4.091234	-4.167095	0.022036	-5.151546	-0.164242	1.677156
-1.843576	-3.642795	-3.679984	-4.112765	0.196562	4.588827
-1.02021	3.530931	-2.487378	-3.48674	-2.180443	-3.597929
-3.363791	0.920097	5.088021	-1.370899	0.976201	1.846254
-2.030365	1.212903	0.131671	-1.013796	-2.172574	2.763817
-1.617247	-1.821466	-5.206256	-4.555793	0.740665	-2.533894
-4.36183	1.950946	-0.855566	-4.38403	-2.395818	0.045017
-3.039747	5.244462	1.800337	-4.266423	-3.973894	2.058329
-3.477591	1.489394	2.750792	-1.164026	0.528961	-4.732485
-3.552663	3.505682	-2.107119	-1.577105	2.800156	4.492982
-3.109569	-1.40564	-0.91744	-2.485581	-5.580425	-0.56538
-4.004739	3.238728	1.309843	-2.823444	-0.807526	3.363698
-1.911987	-0.261233	5.880163	-2.453068	4.8622	-2.680419
-2.559489	2.660687	-4.419231	-2.880426	2.638363	1.197471
-3.019674	-1.44596	4.47351	-4.509964	0.313179	-0.344368
-1.377028	-6.102921	1.098594	-2.149291	-5.105893	2.012321
-5.409609	-2.585645	-1.315683	-5.745151	1.843236	1.361308
-2.186253	-4.678207	-1.155613	-5.30023	2.861373	-1.561469
-1.59763	1.237553	-3.267804	-4.021656	-3.707002	-2.018681
-3.067227	5.329914	-1.110111	-1.654673	1.445427	-1.376871
-3.671746	-1.855537	-4.813492	-3.101309	-1.148259	-1.770143
-5.505486	-0.487748	1.543838	-1.655912	-2.352541	5.547409
-4.376676	1.040072	-2.667119	-1.918109	-2.882758	-4.958871
-2.374447	-0.281567	1.917868	-3.314458	2.770071	-2.499606
-1.608859	-3.15239	2.064554	-1.967469	3.510754	-0.535955
-2.449094	-0.029131	-5.810105	-5.801057	-0.735306	-1.829286
-1.018234	1.903903	4.367739	-3.535317	0.635861	-5.05586
-1.682823	-0.849756	-2.846931	-3.993399	4.3966	0.568537
-2.872308	-4.250072	3.539808	-1.471964	4.994376	2.000992
-4.778905	1.315446	1.009819	-4.876605	-1.878476	2.895856
-1.336113	5.934479	0.08659	-1.336831	-3.051758	-2.868963
-5.618893	-0.527509	-2.64073	-2.194793	0.018213	5.515432
-1.231284	4.208949	3.67896	-1.721576	-1.877785	0.912429
-1.795983	-3.056592	4.880163	-2.344592	-3.938302	4.213601
-4.78655	0.110611	3.627322	-1.249123	-5.665761	-2.183312
-1.064543	5.826269	-2.317829	-1.116183	-1.177279	-2.109067
-6.120206	0.919675	-1.213525	-3.396233	0.825787	2.258398
-2.205835	3.325946	-0.343311	-1.697907	-0.953892	-5.979286
-4.297979	0.165881	-4.659545	-2.679911	-4.350528	-3.58751
-4.991222	3.889489	-0.712188	-1.100715	2.985462	2.398344
-1.132703	1.620906	-5.583066	-2.478454	1.078754	-3.238127
-1.37744	-0.299841	3.867377	-4.376056	-4.559731	0.000507
-1.05571	-5.251221	3.14409	-6.279886	-1.032838	0.106307
-1.502661	4.576558	-4.135646	-1.055093	2.543551	-5.636118
-5.288251	-0.740037	-0.453074	-1.020784	0.906766	3.817916

Table 2. Initial bubble-center coordinates for arrangements C and D. The first row is the centermost bubble.