

Virgo Consortium Meeting

Tuesday-Wednesday 18-19/Nov/03

ICC, Physics Department, Durham 2:00 pm

Tuesday

2:00 – 2:10	Introduction (JIF procurement, VirtU, etc)	Carlos
2:10 – 2:20	Developments at MPA	Simon
2:20 – 2:30	Developments at other nodes	Peter, Frazer
2:30 – 3:00	Dark matter programme	Adrian
3:00 – 3:30	High resolution halos & Gal rotn curves	Julio
3:30 – 3:50	High resolution halos	Darren
3:50 – 4:10	The first object	Gao
4:10 – 4:40	Coffee/tea	
4:40 – 4:55	Sub-halo profiles	Felix
4:55 – 5:15	G6G2 - parallel grape6 gadget2	Naoki
5:15 – 5:30	Flash: simulations of the ICM	Claudio
5:30 – 6:15	Future science programme I Gas programme Additional physics (multi-phase, radiative trans, dust, etc)	
7:30	Dinner at the Millennium restaurant	all

Wednesday

9:15 – 9:30	Millennium project update	Volker
9:30 – 11:00	Millennium run discussion I	
11:00 – 11:30	Coffee	
11:30 – 12:40	Future science programme II DEISA GRID gadget Halos project Common simulation formats Other dark matter programmes	Gavin George Tom
12:40 – 1:00	Large lyman- α runs for δ_k estimation	Tom
1:00 – 1:50	Lunch	
1:50 – 2:20	The virial theorem in clusters	Gus
2:20 – 2:40	Cluster resimulations	Scott
2:40 – 3:00	Accretion of entropy	Dave Rowley
3:00 – 3:20	Simulations of galaxy formation	Takashi
3:20 – 4:00	Short contributions	C. Booth, A. Romanowsky, J. Helly, S. Bamford
4:00 – 4:30	Tea	
4:30 – 5:30	Millennium run discussion II	
5:30	END	

Participants:

Steve Bamford

Mike Balogh

Carlton Baugh

Craig Booth

Richard Bower

Shaun Cole

George Efstathiou

Vince Eke

Gus Evrard

Carlos Frenk

Geraint Harker

Lydia Heck

John Helly

Adrian Jenkins

Scott Kay

Manfred Kitzbichler

Cedric Lacey

Noam Libeskind

Gao Liang

Masahiro Nagashima

Rowena Malbon

Julio Navarro

Takashi Okamoto

Nelson Padilla

John Peacock

Frazer Pearce

Chris Power

Gavin Pringle

Darren Reed

A. Romanowsky

David Rowley

Robert Smith

Volker Springel

Felix Stoehr

Tom Theuns

Peter Thomas

Claudio dalla Vecchia

Peter Watts

Simon White

Naoki Yoshida

Virgo publications: 1997–

This list includes papers written by the Virgo consortium and associates making extensive use of Virgo data.

Refereed journals:

- Abadi M., Moore B. & Bower R.G. 1999. Ram pressure stripping of spiral galaxies in clusters, MNRAS, 308, 947.
- Bartelmann, M., Huss, A., Colberg, J. M., Jenkins, A., & Pearce, F. R. 1998. Arc statistics with realistic cluster potentials. IV. Clusters in different cosmologies, A&A, 330, 1.
- Benson, A.J., Cole, S., Frenk, C.S., Baugh, C. & Lacey, C. 2000a. The Nature of Galaxy Bias and Clustering, MNRAS, 311, 793.
- Benson, A. J., Baugh, C., Cole, S., Frenk, C. S. & Lacey, C. 2000b. The dependence of Velocity and Clustering Statistics on Galaxy properties, MNRAS, 316, 107.
- Benson, A. J., Pearce, F. R., Frenk, C. S., Baugh, C. M. & Jenkins, A. 2001. A Comparison of Semi-Analytic and Smoothed Particle Hydrodynamics Galaxy Formation, MNRAS, 320, 261-280.
- Berlind, A. A., Weinberg, Benson, A. J., Baugh, C. M., Cole, S., Dave, R., Frenk, C. S., Jenkins, A., Katz, N. & Lacey, C. G., 2003, The Halo Occupation Distribution and the Physics of Galaxy Formation, Ap.J, 593, 1.
- Calcaneo-Roldan C., Moore B., Bland-Hawthorn J., Malin D. & Sadler E. 2000. Galaxy destruction and diffuse light in clusters, MNRAS, 314, 324.
- Calcaneo-Roldan C., Moore B., 2000, Surface brightness of dark matter: Unique signatures of neutralino annihilation in the galactic halo, Phys RevD, 62,12.
- Canavezes, A. Springel, V., Oliver, J., Rowan-Robinson, M., Keeble, O. White, S. D. M., Saunders, W., Efstathiou, G., Frenk, C. S., McMahon, R., Maddox, S., Sutherland, W. & Tadros, H. 1998. The topology of the IRAS Point Source Catalogue redshift survey, MNRAS, 297, 777.
- Ciardi, B., Ferrara, A., Governato, F. & Jenkins, A., 2000, Inhomogeneous Reionization Regulated by Radiative and Stellar Feedbacks, MNRAS, 314, 611.
- Colberg, J. M., White, S. D. M., Jenkins, A. & Pearce, F. R. 1999. Linking cluster formation to large-scale structure, MNRAS, 308, 593.
- Colberg, J. M., White, S. D. M., MacFarland, T. J., Jenkins, A., Pearce, F. R., Frenk, C. S., Thomas, P. A. & Couchman, H. M. P. 2000. Peculiar Velocities of Galaxy Clusters, MNRAS, 313, 229.
- Colberg, J. M., White, S. D. M., Yoshida, N., MacFarland, T. J., Jenkins, A., Frenk, C. S., Pearce, F. R., Evrard, A. E., Couchman, H. M. P., Peacock, J. A. & Thomas, 2000, The Clustering of Clusters in CDM Universes, MNRAS, 319, 209.
- Colombi, S., Szapudi, I., Jenkins, A. & Colberg, J. M. 2000. Experimental Cosmic Statistics I : Variance, MNRAS, 313, 711.

- da Silva, A. C., Kay, S. T., Liddle, A. R., Thomas, P. A., Pearce, F. R. & Barbosa, D., 2001, The impact of cooling and heating on the Sunyaev-Zel'dovich effect, *ApJ*, 561, L15.
- da Silva, A. C., Kay, S. T., Liddle, A. R. & Thomas, P. A., 2003, Hydrodynamical simulations of the Sunyaev-Zel'dovich effect: cluster scaling relations and X-ray properties, submitted to *MNRAS*(astro-ph/0308074)
- Diaferio A., Kauffmann G., Colberg J. M., White S. D. M., 1999, Clustering of Surveys, *MNRAS*, 307, 537.
- Evrard, A. E., MacFarland, T. J., Couchman, H. M. P., Colberg, J. M., Yoshida, N., White, S. D. M., Jenkins, A., Frenk, C. S., Pearce, F. R., Efstathiou, G., Peacock, J. A. & Thomas, P. A. 2001, Galaxy Clusters in Hubble Volume Simulations: Cosmological Constraints from Sky Survey Populations, *Astrophys. J.*, 573, 7.
- Frenk, C. S., White, S. D. M., Bode, P., Bond, R. J., Bryan, G. L., Cen, R., Couchman, H. M. P., Evrard, A. E., Gnedin, N. Jenkins, A., Khokhlov, A. M., Klypin, A., Navarro, J. F., Norman, M. L., Ostriker, J. P., Owen, J. M., Pearce, F. R., Pen, U.-L., Steinmetz, M., Thomas, P. A., Villumsen, J. V., Wadsley, J. W., Warren, M. S., Xu, G. & Yepes, G. 1999. The Santa Barbara cluster comparison project: a test of cosmological hydrodynamics codes, *Astrophys. J.*, 525, 524.
- Ghigna S., Moore B., Governato F., Quinn T., Stadel J. & Lake G. 1998. Dark matter halos in clusters, *MNRAS*, 300, 146.
- Ghigna S., Moore B., Quinn T. & Stadel J. 1999. On the structure and substructure of dark matter halos: Converging results with increasing numerical resolution, *MNRAS*, 2000, 544, 616.
- Hamana, T., Yoshida, N., Suto, Y. & Evrard, A. E., 2001, Clustering of dark matter halos on the light cone: scale, time and mass dependence of the halo biasing in the Hubble Volume simulations, *ApJ (lett)*, 561, L143.
- Helly, J. C., Cole, S., Frenk, C. S., Baugh, C. M., Benson, A., Lacey, C. G., & Pearce, F. R., 2003, A comparison of gas dynamics in smooth particle hydrodynamics and semi-analytic models of galaxy formation, *MNRAS*, 338, 913.
- Jain, B., Seljak, U. & White, S. D. M., 2000, Ray Tracing Simulations of Weak Lensing by Large-scale Structure, *Astrophys. J.*, 530, 547.
- Jenkins, A., Frenk, C. S., Pearce, F. R., Thomas, P. A., Colberg, J. M., White, S. D. M., Couchman, H. M. P., Peacock, J. A., Efstathiou, G., & Nelson, A. H. 1998. Evolution of structure in cold dark matter universes, *Astrophys. J.*, 499, 20.
- Jenkins, A., Frenk, C. S., White, S. D. M., Colberg, J. M., Cole, S., Evrard, A. E., Couchman, H. M. P. & Yoshida, N., 2001. The mass function of dark matter haloes, *MNRAS*, 321, 372.
- Kauffmann, G., Colberg, J. M., Diaferio, A. & White, S. D. M. 1999. Clustering of Galaxies in a Hierarchical Universe I: Methods and Results at $z=0$, *MNRAS*, 303, 188.
- Kauffmann G., Colberg J. M., Diaferio A., White S. D. M., 1999. Clustering of Galaxies in a Hierarchical Universe: II. Evolution to High Redshift, *MNRAS*, 307, 529.
- Kay, S. T., Pearce, F. R., Jenkins, A., Frenk, C. S., White, S. D. M., Thomas, P. A., Couchman, H. M. P., 2000, Parameter tests within cosmological simulations of galaxy formation,

- Kay, S. T., Liddle, A. R. & Thomas, P. A., 2001, Sunyaev-Zel'dovich predictions for the Planck Surveyor satellite using the Hubble Volume simulations, MNRAS, 325, 835.
- Kay, S. T., Pearce, F. R., Frenk, C. S. & Jenkins, A. 2002, Including star formation and supernova feedback within cosmological simulations of galaxy formation, MNRAS, 330, 113.
- Kay, S. T., Thomas, P. A. & Theuns, T., 2003, The impact of galaxy formation on X-ray groups, MNRAS, 343, 608.
- Kazantzidis, S., Magorrian, J. & Moore, B., 2003, Generating Equilibrium Dark Matter Halos: Inadequacies of the Local Maxwellian Approximation, ApJ, in press.
- Linder, E. V. & Jenkins, A., 2003, Cosmic Structure growth and dark energy, MNRAS, (accepted for publication)
- MacFarland, T, Couchman, H. M. P., Pearce, F. R., Pichlmeier, J. 1999. A New Parallel P³M Code for Very Large-Scale Cosmological Simulations, New Astronomy, 3, 687.
- Moore B. 1999. The dark side of the universe. Phil.Trans.Roy.Soc., 357, no. 1763, 3259.
- Moore B., Ghigna S., Governato F., Lake G., Quinn T., Stadel J. & Tozzi P. 1999. Dark matter substructure in galactic halos, ApJ Letters, 524, 19-22.
- Moore B., Governato F., Quinn T., Stadel J. & Lake G. 1998. Resolving the structure of cold dark matter halos, Astrophys. J. Lett., 499, L5.
- Moore B., Lake G., Quinn T. & Stadel J. 1999. On the survival and destruction of spiral galaxies in clusters, MNRAS, 304, 465.
- Moore B., Quinn T., Governato F., Stadel J. & Lake G. 1999. Cold collapse and the core catastrophe, MNRAS, 310, 1147.
- Moore, B., Gelato, S., Jenkins, A., Pearce, F. R. & Quillis, V., 2000, Collisional versus Collisionless Dark Matter, ApJ Lett, 535, 21.
- Moore, B., Calcaneo-Roldan C., Stadel, J., Quinn, T., Lake, G., Ghigna, S. & Governato, F., 2001, Dark matter in Draco and the Local Group: Implications for direct detection experiments, Phys Rev D, 64, 3508
- Muanwong, O., Thomas, P. A., Kay, S. T., Pearce, F. R. & Couchman, H. M. P., 2001, The effect of radiative cooling on scaling laws of X-ray groups and clusters, ApJ, 552, L27.
- Muanwong, O., Thomas, P. A., Kay, S. T., Pearce, F. R. ,2002, The effect of cooling and preheating on the X-ray properties of clusters of galaxies, MNRAS, 336, 527.
- Onuora, L. I., Kay, S. T. & Thomas, P. A., 2003, Simulated X-ray Cluster Temperature Maps, MNRAS, 341, 1246.
- Okamoto, T., Jenkins, A., Eke, V. R., Quillis, V. & Frenk, C. S., 2003, Momentum transfer across shear flows in Smoothed Particle Hydrodynamic simulations of galaxy formation, MNRAS, in press (astro-ph/0306568)
- Padilla, N.D. & Baugh, C.M., 2002, 'Clustering of clusters in redshift space', MNRAS, 329, 431.

- Pearce, F. R. & Couchman, H. M. P. 1997. Hydra: an adaptive parallel grid code, *New Astronomy*, 2, 411.
- Pearce, F. R., Couchman, H. M. P., Thomas, P. A., Edge, A. C., 2000. The effect of radiative cooling on the radial density and temperature profiles of galaxy clusters, *MNRAS*, 317, 1029.
- Pearce, F.R., Jenkins, A., Frenk, C.S., Colberg, J.M., White, S.D.M., Thomas, P.A., Couchman, H.M.P, Peacock, J.A., & Efstathiou, G. (The Virgo Consortium), 1999. A simulation of galaxy formation and clustering, *Astrophys. J. Lett.*, 521, 99.
- Pearce, F. R., Jenkins, A., Frenk, C. S., White, S. D. M., Thomas, P. A., Couchman, H. M. P., Peacock, J. A. & Efstathiou, G., 2001, Simulations of galaxy formation in a cosmological volume, *MNRAS*, 326, 649.
- Power, C., Navarro, J. F., Jenkins, A., Frenk, C. S., White, S. D. M., Springel, V., Stadel, J. & Quinn, T., 2003, The inner structure of LCDM haloes - I. A numerical convergence study, *MNRAS*, 338,14.
- Scoccimarro, R., Couchman, H.M.P. & Frieman, J.A., 1999. The bispectrum as a signature of gravitational instability, *Astrophys. J.*, 517, 531.
- Smith, R., Peacock, J. A., Jenkins, A., White, S. D. M., Frenk, C. S., Pearce, F. R., Thomas, P. A., Efstathiou, G. & Couchman, H. M. P., 2003, Stable clustering, the halo model and nonlinear cosmological power spectra, *MNRAS*, 341, 1311.
- Springel, V., White, S. D. M., Colberg, J. M., Couchman, H. M. P., Efstathiou, G., Frenk, C. S., Jenkins, A. R., Pearce, F. R., Nelson, A. H., Peacock, J. A. & Thomas, P. A. 1997. Genus statistics of the Virgo N-body simulations and the 1.2Jy redshift survey, *MNRAS*, 298, 1169-1188.
- Szapudi, I., Colombi, S., Jenkins, A. & Colberg, J. M. 2000. Experimental Cosmic Statistics II : Distribution, *MNRAS*, 313, 725.
- Theuns, T., Leonard, A. & Efstathiou, G., 1998, The low redshift evolution of the Lyman- α Forest, *MNRAS*, 297, L49.
- Theuns, T., Leonard, A., Efstathiou, G., Pearce, F. R. & Thomas, P. A., 1998, P³M-SPH simulations of the Lyman- α Forest, *MNRAS*, 301, 478.
- Theuns T., Leonard A., Schaye J., Efstathiou, G., 1999, Dependencies of QSO Lyman-alpha absorption line statistics on cosmological parameters, *MNRAS*, 303, L58.
- Thacker, R. J., Tittley, E. R., Pearce, F. R., Couchman, H. M. P., Thomas, P. A., 2000. Smoothed Particle Hydrodynamics in cosmology: a comparative study of implementations, *MNRAS*, 319, 619.
- Thomas, P., Couchman, H., Jenkins, A., Pearce, F., Frenk, C. S, White, S. D. M., Colberg, J., Peacock, J., Efstathiou, G. & Nelson, A. 1998. The structure of clusters in different cosmologies, *MNRAS*, 296, 1061.
- Thomas, P. A., Muanwong, O., Pearce, F. R., Couchman, H. M. P., Edge, A. C., Jenkins, A. & Onuora, L., 2001. A simulated TCDM cosmology cluster catalogue: the NFW profile and the temperature-mass scaling relations, *MNRAS*, 324, 450.
- Thomas, P. A., Muanwong, O., Kay, S. T., Liddle, A. R., 2002, Can simulations reproduce the

observed temperature-mass relation for clusters of galaxies?, MNRAS, 330,48

Viana, P. T. P., Kay, S. T., Liddle, A. R., Muanwong, O. & Thomas. P. A., 2003, The power spectrum amplitude from clusters revisited: σ_8 using simulations with preheating and cooling, MNRAS, in press (astro-ph/0211090)

Yoshida, N., Colberg, J., White, S. D. M., Evrard, A. E., MacFarland, T. J., Couchman, H. M. P., Jenkins, A., Frenk, C. S., Pearce, F. R., Efstathiou, G., Peacock, J. A. & Thomas, P. A., 2001, MNRAS, 325, 803.

Non-Virgo papers making significant use of Virgo data

Benson, A. J.; Nusser, A; Sugiyama, N. & Lacey, C. G, 2001, Non-uniform reionization by galaxies and its effect on the cosmic microwave background, MNRAS, 320, 153.

Canavezes, A. & Sharpe, J., 2001, Recovering the Topology of the Initial Density Fluctuations Using the IRAS Point Source Catalogue Redshift Survey, MNRAS, 326, 209.

Hikage, C., Taruya, A., Suto, Y. , 2003, Biasing and Genus Statistics of Dark Matter Halos in the Hubble Volume Simulation, PASJ, 55,2.

Hoyle, F., Baugh, C. M., Shanks, T. & Ratcliffe, A., 1999, The Durham/UKST Galaxy Redshift Survey - VI. Power spectrum analysis of clustering, MNRAS, 309, 659.

Hoyle, F., Outram, P. J., Shanks, T., Croom, S. M., Boyle, B. J., Loaring, N. S., Miller, L. & Smith, R. J., 2002, The 2dF QSO Redshift Survey - IV. The QSO power spectrum from the 10k catalogue, MNRAS, 329, 336.

Hoyle, F., Outram, P. J., Shanks, T., Boyle, B. J., Croom, S. M. & Smith, R. J., 2002, The 2dF QSO Redshift Survey - VII. Constraining Cosmology from Redshift Space Distortions via $\xi(\sigma, \pi)$ MNRAS, 332, 311.

Kolokotronis, V., Basilakos, S. & Plionis, M., 2002, Supercluster properties as a cosmological probe, MNRAS, 331, 1020.

Norberg, P., Baugh, C.M., Hawking, E., Maddox, S., Peacock, J., Cole, S., Frenk, C.S., Bland-Hawthorn, J., Bridges, T., Cannon, R., Colless, M., Collins, C., Couch, W., Dalton, G., Driver, S.P., Efstathiou, G., Ellis, R.S., Glazebrook, K., Jackson, C., Lahav, O., Lewis, I., Lumsden, Peterson, B.A., Sutherland, W. & Taylor, K. (the 2dFGRS team) (2001), The 2dF Galaxy Redshift Survey: Luminosity dependence of galaxy clustering, MNRAS, 328, 64-70.

Norberg, P., Cole, S., Baugh, C. M., Frenk, C. S., Baldry, I., Bland-Hawthorn, J., Bridges, T., Cannon, R., Colless, M., Collins, C. and 18 coauthors, 2002, The 2dF Galaxy Redshift Survey: the bJ-band galaxy luminosity function and survey selection function, MNRAS, 336, 907.

Peacock, J. A. & Smith. R. E., 2000, Halo occupation numbers and galaxy bias, MNRAS, 318, 1144

Peacock, J.A., Cole, S., Norberg, P., Baugh, C.M., Bland-Hawthorn, J., Bridges, T., Cannon, R.D., Colless, M., Collins, C., Couch, W., Dalton, G., Deeley, K., De Propis, R., Driver, S.P., Efstathiou, G., Ellis, R.S., Frenk, C.S., Glazebrook, K., Jackson, C., Lahav, O., Lewis, I., Lumsden, S., Maddox, S., Percival, W.J., Peterson, B.A., Price, I., Sutherland, W., Taylor, K., (the 2dFGRS team) (2001), Measuring the cosmological mass density with clustering in

the 2dF Galaxy Redshift Survey, *Nature*, **410**, 169-173.

- Percival, J., Baugh, C.M., Bland-Hawthorn, J., Bridges, T., Cannon, R.D., Cole, S., Colless, M., Collins, C., Couch, W., Dalton, G., De Propis, R., Driver, S.P., Efstathiou, G., Ellis, R.S., Frenk, C.S., Glazebrook, K., Jackson, C., Lahav, O., Lewis, I., Lumsden, S., Maddox, S., Moody, S., Norberg, P., Peacock, J.A., Peterson, B.A., Sutherland, W., Tadros, H., Taylor, K. I.A., Price, M., Seaborne, (2001), The 2dF Galaxy Redshift Survey: The power spectrum and the matter content of the universe, *MNRAS*, 327, 1297-1306.
- Outram, P. J., Hoyle, Fiona, Shanks, T., Croom, S. M., Boyle, B. J., Miller, L., Smith, R. J. & Myers, A. D., 2003, The 2dF QSO Redshift Survey - XI. The QSO power spectrum, *MNRAS*, 342, 483.
- Reblinsky, K., Krusc, G., Jain, B. & Schneider, P., 1999, Cosmic shear and halo abundances: Analytical versus numerical results, *A&A*, 351, 815.
- Sheth, R. K. & Tormen, G., 1999, Large-scale bias and the peak background split, *MNRAS*, 308, 119.
- Voit, G. M. & Bryan, G. L., 2001, On the Distribution of X-Ray Surface Brightness from Diffuse Gas, *Ap.J*, 551, 139.
- Voit, G. M., Evrard, A. E., Bryan, G. L., 2001, Confusion of Diffuse Objects in the X-Ray Sky, *Ap.J* 548, 123.
- Yamamoto, K., 2003, cosmological Constraint from the 2dF QSO Spatial Power Spectrum, *MNRAS* in press (astro-ph/0205505).