

¹Lynch et al., Phys. Letters 35B, 427 (1971).
²E. Berger and G. Fox, Phys. Letters 36B, 389 (1971).
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BI 17 Meson Production Near the T(2190).* A. P. SHENG, E. B. BRUCKER,† T. HANDLER, D. PANDOULAS, R. J. PLANO, H. PREISSNER, T. L. WATTS, P. YAMIN, Rutgers Univ.; E. L. KOLLER, W. F. BROOKS, O. RATHS, S. TAYLOR, Stevens Institute of Technology; P. E. STAMER, Seton Hall Univ.; J. U. GRAUMAN, Jersey City State Col.; C. R. SUN, M. DICKINSON, SUNY, Albany.-- $\bar{p} p \rightarrow \pi^+ \pi^- \pi^+ \pi^- (\pi^0)$ annihilations in the Brookhaven National Laboratory 31" hydrogen bubble chamber have been analyzed using the Rutgers-Stevens PEPR system. We have studied single and multiple ρ , ω , f , A_2 , and π production and relate this to t-channel factorization.

BI 18 He³ Photodisintegration in the First Nucleon Resonance Region.* K.T. McDONALD, C.A. HEUSCH*† R.V. KLINE, and C.Y. PRESCOTT,** Caltech.--In order to study interference effects between resonant and non-resonant intermediate states in the photodisintegration of He³, we measured differential cross-sections for the process $\gamma + \text{He}^3 \rightarrow p + d$ at incoming photon energies from 200 to 500 McV; the angular acceptance was from 30° to 150° in the center of mass frame. A wire chamber-magnetic spectrometer and a wire chamber array were used to detect both final-state particles. We will present the final results of our analysis.

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MONDAY AFTERNOON, 24 APRIL 1972

(P. BERGMANN presiding)

FREDERICK ROOM AT 2:00 P.M.

Gravitation and Relativity

BJ 1 Search for Optical Pulsars.* MARK R. NELSON†, Princeton U.--Using on-line digital techniques at the Princeton 36" telescope, we obtained time series on pulsar candidates drawn from four classes: single-line binary stars with anomalously heavy unseen companions (10 examples), recent novae (3), x-ray sources (4), and extragalactic supernovas (1). We examined the data through autocorrelation and power spectrum analysis for both narrow- and wide-band features. Minimum bandwidths range from 2×10^{-3} Hz to 5×10^{-4} Hz, while the maximum frequency varies from 500 Hz to 5000 Hz.

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 †Submitted by P. J. E. PEBBLES

view that this system is 10^{10} y old on the basis (a) of a scaling model for the central cluster and (b) of a numerical model of the evolution of the surrounding clouds.

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BJ 2 Measurement of Stellar Masses.* WILLIAM C. WICKES, Princeton U.--An interferometric photometer has been constructed to resolve binary stars of less than 1 arc-second separation. Stellar masses are obtained from the binary separation and orbital period. The intent is to obtain the Helium abundance of Population II binaries, representatives of which have too large a magnitude difference to be resolved by conventional means. The system uses high frequency chopping and extended coherent integration to overcome the effects of atmospheric deterioration of the image. Measurements are being carried out on the 26-inch refractor at the U. S. Naval Observatory, Washington, D. C.

*Work supported in part by the N.S.F.

BJ 4 "Missing Mass" in Small Groups of Galaxies.* MARGARET J. GELLERT†, Princeton U.--Accidental superposition of field galaxies or external groups on a given group may account for apparent mass discrepancies. We attempt to evaluate the extent of such effects by applying the virial theorem to small groups of galaxies produced by Peebles' computer model of group formation. A statistical analysis of the computer model is compared with an analysis of bright galaxies listed in the de Vaucouleurs catalogue.

*Work supported in part by the N.S.F.
 †Submitted by P. J. E. Peebles

BJ 3 The Many Faces of Missing Mass.* P. J. E. PEBBLES, Princeton U.--The Virgo Cluster of galaxies and the associated clouds of galaxies exhibit several aspects of the missing mass problem (see e.g. A. J. 66, 533-652, 1961). In the cluster proper the velocity dispersion seems surprisingly high in relation to the conventional estimates of masses of the galaxies if the system is gravitationally bound. The galaxies around the cluster are distributed in a strikingly ordered fashion. Nonetheless it is argued that it is possible to rationalize these observations with the

BJ 5 An Experiment to Measure the Total Luminosity of Nearby Clusters of Galaxies.* VINCENT RUDDY†, Princeton U.--The method consists of photometrically scanning (in right ascension) at low angular resolution across the clusters, and integrating the data over many scans. The total luminosity thus obtained, the contribution of field stars being subtracted, is compared to the contribution of individual galaxies in an effort to reconcile the missing mass problem in such bound systems.

*Work supported in part by the N.S.F.
 †Submitted by P. J. E. PEBBLES

BJ 6 Spin-spin Electromagnetic and Gravitational Interaction in General Relativity.* D. WILKINS, Stanford Univ.; R. RUFFINI and J. TIOMNO, Princeton Univ.--Hawking¹ has suggested the existence of a spin dependent force between two black holes. The gravitational spin-