$$\mathcal{L}_{\rm int}=g_r A^\mu(\chi\partial_\mu\phi-\phi\partial_\mu\chi)-g_r m_r A^\mu A_\mu\chi-\tfrac{1}{2}g_r^2A_\mu A^\mu(\chi^2+\phi^2)-\mu(\tfrac{1}{2}h_r)^{1/2}\chi(\chi^2+\phi^2)$$
$$-\tfrac{1}{4}h_r(\chi^2+\phi^2)^2+g_r\bar\psi\gamma_\mu\tfrac{1}{2}(1+i\gamma_5)\psi A^\mu-\frac{m_e}{m_r}g_r\bar\psi\psi\chi-\frac{m_e}{m_r}g_r\bar\psi\gamma_5\psi\phi\ ,$$

and

$$\int d^4x\,\mathcal{L}_{\rm gauge}=-i\,\mathrm{Tr}\ln\left(1+\frac{(Z_\alpha Z_\beta{}^{-1}Z_gZ_v-1)m_r{}^2+Z_\alpha Z_\beta{}^{-1}Z_gZ_\chi{}^{1/2}m_rg_r\chi}{-\partial^2+m_r{}^2}\right)\ .$$

Note that the relation

$$h_rv_r{}^2+\bar\mu_r{}^2=0$$

is true, which results in vanishing $\langle\chi\rangle$ in the tree approximation.

The perturbation series is now obtained by the standard procedure.

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[1]The execution of this program in the unitarity gauge has been carried out by T. Appelquist and H. Quinn (private communication).

[2]Y.-P. Yao, Phys. Rev. D 7, 1647 (1973). Notations and metric used in this note are the same as those in this reference.

[3]G. 't Hooft, Nucl. Phys. B33, 173 (1971), B35, 167 (1971); B. W. Lee, Phys. Rev. D 5, 823 (1972); B. W. Lee and J. Zinn-Justin, *ibid.* 5, 3121 (1972); 5, 3137 (1972); 5, 3155 (1972); E. S. Fradkin and I. V. Tyutin, P. N. Lebedev Physical Institute Report No. N55, 1972 (unpublished).

[4]For example, A. A. Slavnov, Kiev report, 1971 (unpublished).

[5]A somewhat restricted class of gauges with $\kappa^2=\xi m^2$ has been considered by K. Fujikawa, B. W. Lee, and A. I. Sanda, Phys. Rev. D 6, 2923 (1972).

[6]T. D. Lee and C. N. Yang, Phys. Rev. 128, 885 (1962).

[7]E. C. G. Stueckelberg, Helv. Phys. Acta 11, 299 (1938); R. P. Feynman, Acta Phys. Polon. 24, 697 (1963); 't Hooft (see Ref. 3).

[8]In fact, we do not expect them to be satisfied because of the Adler-Bell-Jackiw-type anomaly. See D. Gross and R. Jackiw, Phys. Rev. D 6, 477 (1972); C. Bouchiat, J. Iliopoulos, and Ph. Meyer, Phys. Lett. 38B, 519 (1972).

[9]T. Appelquist and H. Quinn, Phys. Letters 39B, 229 (1972).

[10]P. W. Higgs, Phys. Letters 12, 132 (1964), Phys. Rev. Letters 13, 508 (1964); Phys. Rev. 145, 1156 (1965); T.W.B. Kibble, *ibid.* 155, 1554 (1966); G. Guralnik, C. R. Hagen, and T. W. B. Kibble, Phys. Rev. Letters 13, 585 (1964); F. Englert and R. Brout, *ibid.* 13, 321 (1964).

[11]L. D. Fadde'ev and V. N. Popov, Phys. Letters 25B, 29 (1967).

[12]There are three conditions on $\langle(A^\mu A^\nu)_+\rangle$, which lead to finite renormalized mass and coefficients multiplied to $g^{\mu\nu}$ and $\partial^\mu\partial^\nu$. One condition is required to give finite A_μ-ϕ mixing. Finite renormalized wave function and mass for ϕ and χ yield two conditions each. Finally, there are three conditions on ψ.

[13]We have not checked the four-point functions. However, if anything, their divergence behavior should be milder and we are hopeful of consistency.

[14]G. 't Hooft and M. Veltman, Nucl. Phys. B44, 189 (1972). For further references and other contribution, see G. M. Cicuta, SLAC report (unpublished), submitted to Sixteenth International Conference in High Energy Physics, Batavia, Illinois, 1972 (unpublished).

[15]The induced couplings are also finite.

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Erratum

Pion Condensation in Superdense Nuclear Matter, R. F. Sawyer and D. J. Scalapino [Phys. Rev. D 7, 953 (1973)]. Equation (2.9) should read:

$$\mathcal{H}_C=\sum_q\left[\left(\frac{q^2}{2M}+\Omega_-\right)\bar u_qu_q+\left(\frac{q^2}{2M}+\Omega_+\right)\bar v_qv_q\right]+XN\omega_k\,.$$